



A Descriptive Observational Study of Suicidal Poisoning Cases Admitted to A Peripheral Tertiary Care Hospital in South India

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Abstract

Background: To carry out detailed analysis of demographical, distribution, trend and outcome of suicidal poisoning cases admitted to a peripheral tertiary care hospital in South India **Method:** 173 patients admitted with alleged history of poisoning (suicidal) to a periphery tertiary care hospital were studied from November 2022 to January 2023. Data from these patients were collected on a pre-structured proforma. The data were analysed with respect to age, sex, mode of admission, type of poisoning, time interval between ingestion and stomach wash, vitals at the time of admission, duration of stay in the hospital and its outcome. **Results:** Total of 173 cases were analysed. More than half of the patients were male 102(59%). In our study many were of young age group 13-30 years (56%). Majority of patients were from rural areas(86%) and many belonged to low socioeconomic class IV(51%). Majority were involved in agriculture and its related activities -106(61%). Among 173 cases, 104(60%) were directly admitted to our institution. More than half of the male patients(59%) had consumed the poison under the influence of alcohol. Delay in time interval between ingestion and stomach wash was associated with poorer outcome and increased mortality. Vitals on admission have significant impact on outcome and cases having unstable vitals on admission had higher mortality. Ant killer powder(18%) was the most common poison consumed in our study but had zero mortality. Among 23 deaths, majority of deaths were due to OPC poisoning- 12(52%), since it was easily available in our delta(agricultural) region. Paraquat poisoning had highest mortality rate of 75% in our study. **Conclusion:** Young adults(13-30yrs) and males constitute majority of the cases admitted with suicidal poisoning in our study. Most of the males admitted with poisoning had taken it under the influence of alcohol. Insecticide poisons were the most common in our area and among them the highest mortality rate was seen in paraquat and OPC poisoning.

Keywords: Suicidal Poisoning, Vitals, Outcome, OPC poisoning.

Introduction: A poison is a substance that is capable of causing illness or harm to living organisms on contact or upon introduction into the body and may be used deliberately with this intent. Poisoning is a significant global public health problem. WHO estimates that, in 2016, unintentional poisoning caused 1,06,683 deaths and loss of 6.3 million years of healthy life (DALY). In many countries, poisoning is one of the main cause of emergency attendance at hospitals. In India, according to NCRB reports, poisoning was estimated to contribute 4.6% of 4,51,757 accidental deaths in 2014 and 6.3% of 4,13,457 accidental deaths in 2015. In South India, where farmers form a significant proportion of population, agro chemical poisoning is more common. Various types of poisoning includes OPC compounds, insecticides, pesticides, rodenticides, herbicides, and corrosives. Suicide attempts among adults, especially in age group of 21 to 30 years, is common due to lack of employment, failure of love affairs, impulsive behaviours, stress due to job and family etc.,. Suicide attempts among middle age group is mostly due to socioeconomical stress and family issues. Recent studies have shown that a high mortality is due to depression leading to suicide. The morbidity and mortality due to acute poisoning have been mainly due to agro chemicals which appear to be a by-product of the green revolution in South Asia. Aim of our study is to analyse the trend of poisoning cases in our locality and to apply this knowledge for various interventions at community level, primary health centre level and tertiary care institution level for mitigation of morbidity and mortality among poisoning cases admitted.

Aim

To carry out detailed analysis of demographical, distribution, trend and outcome of suicidal poisoning cases admitted to a peripheral tertiary care hospital in South India.

Methods

Study design: Institution based descriptive (observational) cross sectional study.

Study duration: November 2022 to January 2023

Study centre: Department of general medicine, Government Thiruvarur Medical College Hospital, Thiruvarur, Tamil Nadu.

Study population: 173 patients admitted with alleged history of suicidal poisoning in the wards, ICU, HDU of medicine department of Government Thiruvarur Medical College Hospital.

Inclusion criteria: Patients of age 13 years and above with alleged history of suicidal poisoning

Exclusion criteria:

1. Patients who have chronic neuromuscular disorder
2. Patients who have preexisting respiratory illness
3. Patients having chronic liver disease
4. Patients having renal dysfunction

The study was carried out from November 2022 to January 2023. Total suicidal poisoning cases admitted in the above mentioned period was 190. After excluding the above said patients, 173 were selected for study and analysed. Various data were collected including demographic details, type of poison, mode of poisoning, time interval between ingestion and stomach wash, alcohol intoxication, duration of hospital stay and outcome. All these data were segregated and interpreted to analyse the trend of poisoning in our area with respect to

age, gender, residence, common type of poisoning, time interval between ingestion and stomach wash, vitals at time of admission, duration of hospital stay and its relation to outcome. The observations made from our study are depicted in the following tables.

Results

Based on Gender Marital status and Age

Out of 173 patients studied, 102 (59%) were male and 71(41%) were female. Based on age group, 98 (56%) belongs to the age group of 13-30 years, 63 (37%) belongs to 31-60 years and 12 (7%) belongs to >60 years age group. In our study, suicidal poisoning was more common among males and they belong to age group of 13-30 years. Based on the history taken from this age group, factors responsible for increased incidence of suicidal poisoning among this age group are impulsive behaviour, unemployment, love affairs and inability to cope up with stress. Out of 173 patients, 108(62%) were unmarried and 65(38%) were married.

Our study shows a male predominance occupying 59% while 41% were females. Also majority of our patients (54%) belonged to the age group of 13 – 30 years. This is in concordance with the study done by M Rajesh Kumar et al¹ and Getnet Mequanint Adinew et al².

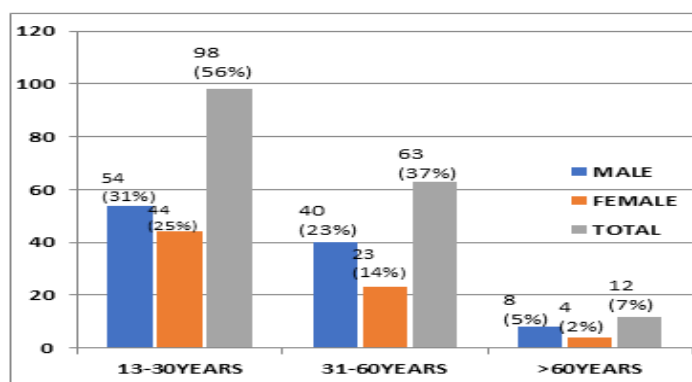


Figure 1

Table 1: Age Distribution

Age (Years)	Male(%)	Female(%)	Total
13-30	54(31%)	44(25%)	98(56%)
31-60	40(23%)	23(14%)	63(37%)
>60	8(5%)	4(2%)	12(7%)
Total	102(59%)	71(41%)	173(100%)

Table 2: Gender

Gender	Male	Female	Total
NO OF PATIENTS	102 (59%)	71 (41%)	173 (100%)

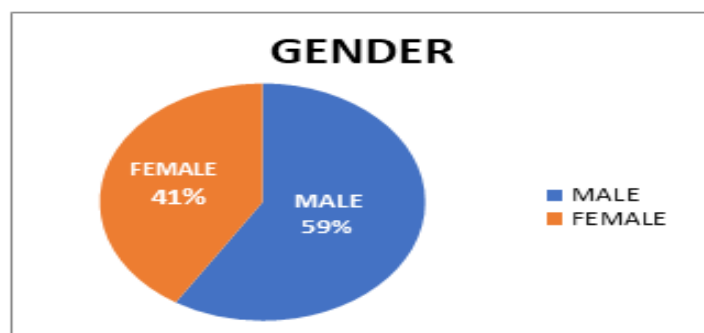


Figure 2

Table 3: Marital Status

Marital Status	Married	Unmarried	Total
NO. OF PATIENTS	65(38%)	108(62%)	173(100%)

Based on Residence, Occupation, Socioeconomic Status

Among the patients studied, 149(86%) were from rural areas and 24(14%) were from urban areas. Based on occupation, 106(61%) were doing agriculture and related activities, 33(19%) were involved in other occupations like business, mason, cooli, 23(13%) were students and 11(7%) were unemployed. This result is similar to a study conducted by S.B.Marahatta et al³. Based on revised BG Prasad classification 2021 socioeconomic status, in our study, majority were from class IV-87(51%) and class III-63(36%). Our study is similar to the study by Suganthi et al⁴.

Since this area belongs to delta region of Tamilnadu, most of the suicidal poisoning cases were from rural areas, doing agricultural related activities and belonging to low socioeconomic class. This is in concordance with the study by Lalith Senarathna et al⁵.

Table 4 socioeconomic status

Socioeconomic Status	N%
I	2(1%)
II	9(5%)
III	63(36%)
IV	87(51%)
V	12(7%)
TOTAL	173(100%)

Table 5: Residence

Residence	Rural	Urban	Total
NO.OF PATIENTS	149(86%)	24(14%)	173(100%)

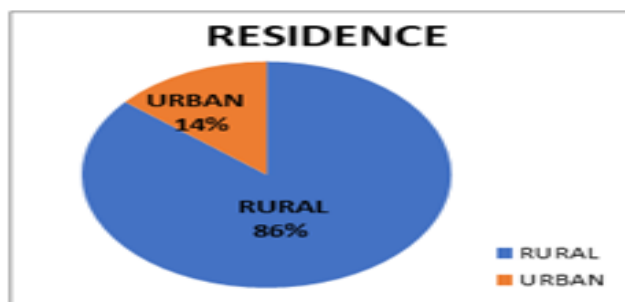


Figure 3

Table 6: Occupation

Occupation	N%
Agriculture and related activities	106(61%)
Others	33(19%)
Students	23(13%)
Unemployed	11(7%)
Total	173(100%)

Based on Mode of Admission: Out of 173 patients, 104 (60%) were directly admitted to GTMCH and 69 (40%) were referred from peripheral health institutions since our centre is a referral hospital for two districts.

Table 7: Mode of Admission

Mode of Admission	Direct	Referral	Total
NO. OF PATIENTS	104(60%)	69(40%)	173(100%)

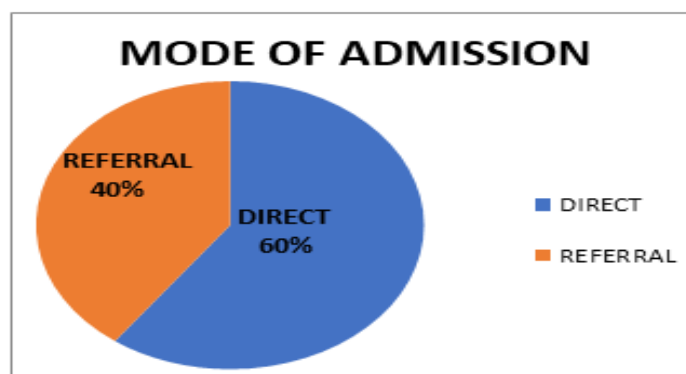


Figure 4

Based on Time Interval Between Ingestion and Stomach Wash

In our study, patients were segregated into three groups based on time interval between ingestion and stomach wash given and outcomes was measured among groups.

162 (93.5%) cases belongs to group I (<6 Hours),

10 (6%) cases belong to group II (7-24hours),

1 (0.5%) cases belong to group III (>24hours).

Mortality rate among Group I is 12% (19), Group II is 30% (3), Group III is 100% (1).

From our study, we found that the 93.5% of patients received treatment within 6 hrs of poison intake. Our result is similar to the Getnet Mequanint Adinew et al² study. According to our study, the delay in time interval between ingestion and stomach wash was associated with poorer outcome and increased mortality.

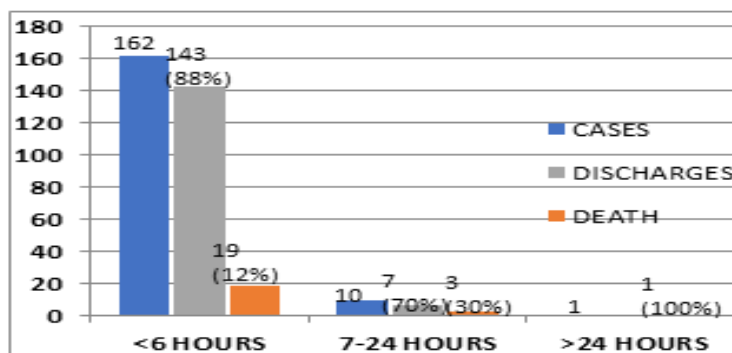


Figure 5

Table 8: Time Interval Between Ingestion and Stomach Wash

GROUP	TIME INTERVAL	CASES	DISCHARGES	DEATH (MORTALITY)
GROUP I	<6 HOURS	162 (93.5%)	143 (88%)	19 (12%)
GROUP II	7-24 HOURS	10 (6%)	7 (70%)	3 (30%)
GROUP III	>24 HOURS	1 (0.5%)	0 (0%)	1 (100%)
	TOTAL	173 (100%)	150 (87%)	23 (13%)

Time Interval Between Ingestion and Stomach Wash

Based on this data, it is evident that delay in time interval between ingestion and stomach wash is associated with poorer outcome and increased mortality

Based on Alcohol Intake

Out of 173 cases, 60 (35%) cases consumed poison under the influence of alcohol. All 60 patients were male. Among 102 male patients, majority 60(59%) consumed poison under the influence of alcohol.

Table 9: Under Influence of Alcohol

Under Influence of Alcohol	Yes	No	Total
MALE	60(59%)	42(41%)	102
FEMALE	0(0%)	71(100%)	71
	60(35%)	113(65%)	173

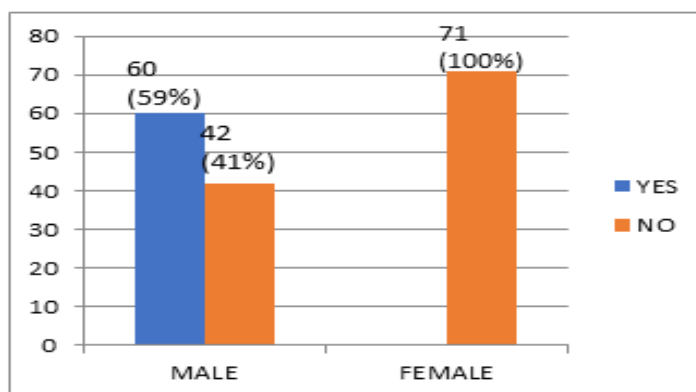


Figure 6: Under Influence of Alcohol

Based on Vitals During Admission

Among 173 poisoning cases, 161(93%) had vitals stable at the time of admission and 12(7%) had unstable vitals like hypotension, tachycardia, tachypnea, hypoxia, poor GCS on admission. Mortality rate among cases having unstable vitals on admission was 92%. It shows that vitals on admission have significant impact on the outcome and cases having unstable vitals on admission have higher mortality rate.

Table 10: Vitals on Admission and Outcome

Vitals On Admission	Cases	Discharges	Deaths
STABLE	161(93%)	149(92%)	12(8%)
UNSTABLE	12(7%)	1(8%)	11(92%)
TOTAL	173 (100%)	150	23

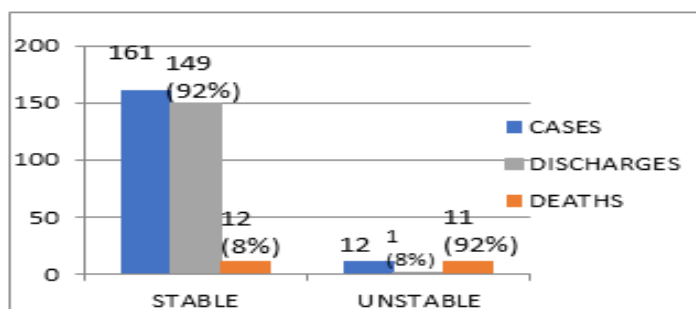


Figure 7: Vitals on Admission and Outcome

Based on Type of Poison

Out of 173 cases, majority of patients consumed Ant-killer powder – 31(18%).The next common poisoning in our study was organophosphorous-21(12%) and rat killer paste-21(12%). Other poisoning includes plant poisoning(11%), rat killer cake(9%), rat killer powder(3%), corrosives(9%), Tablet overdose(8%), herbicide(6%), insecticide(5%), paraquat(3%), fertilizer(2%) and unknown poisoning(2%).

Table 11: Types of Poison

Sr.No	Types of Poison	N%
1	ANT KILLER POWDER	31(18%)
2	ORGANOPHOSPHOROUS	21(12%)
3	RAT KILLER PASTE	21(12%)

4	PLANT POISONING	20(11%)
5	RAT KILLER CAKE	16(9%)
6	CORROSIVE	16(9%)
7	TABLET OVERDOSE	14(8%)
8	HERBICIDE	10(6%)
9	INSECTICIDE	9(5%)
10	RAT KILLER POWDER	5(3%)
11	PARAQUAT	4(3%)
12	FERTILIZER POISONING	3(2%)
13	UNKNOWN POISONING	3(2%)
	TOTAL	173(100%)

This data shows that, the most common compound used for suicidal poisoning in our region were Ant killer powder and organophosphorous compound.

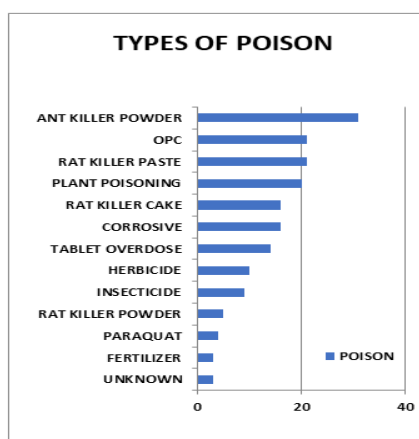


Figure 8

Among our patients, 18% had consumed Ant Killer Powder, 12% OPC, 12% Rat Killer Paste. This shows that agriculture poison is common in our area. This study is similar to the study done by Chaitanya Mittal et al⁶.

Distribution of various types of poisoning is depicted in following illustrations.

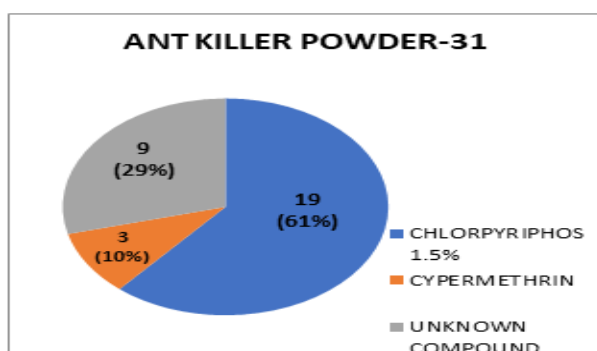


Figure 9

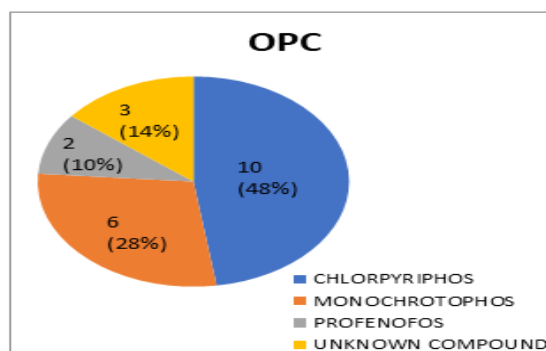


Figure 10

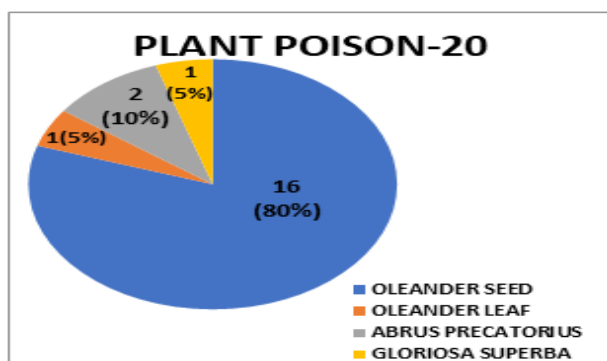


Figure 11

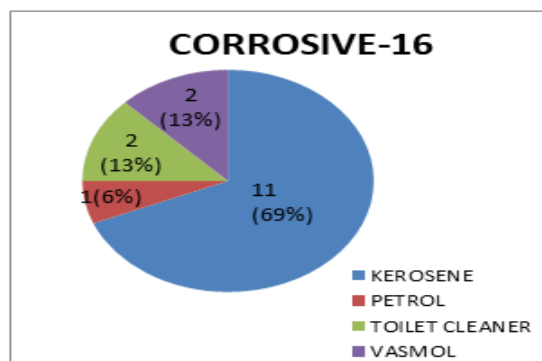


Figure 12

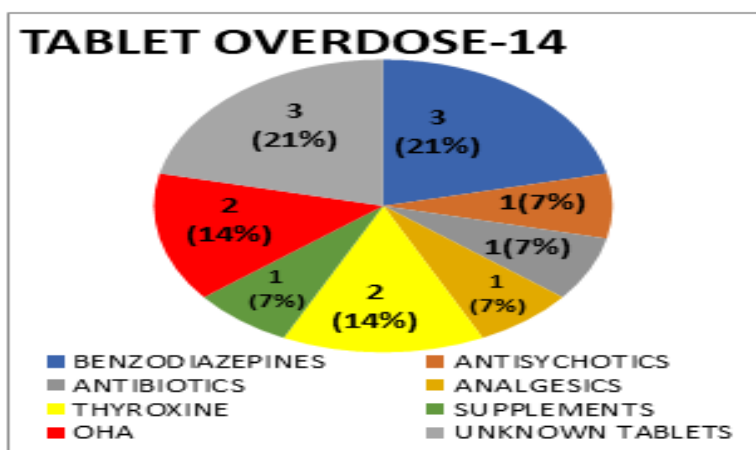


Figure 13

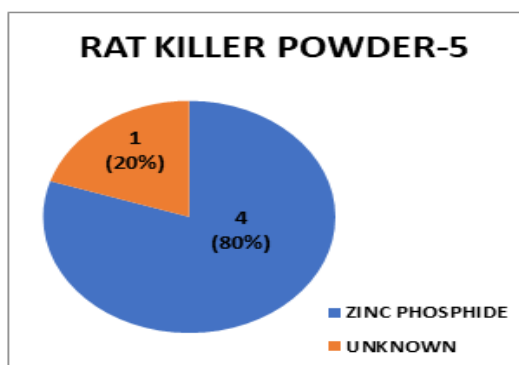


Figure 14

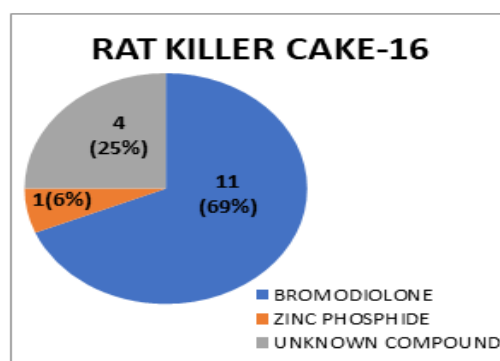


Figure 15

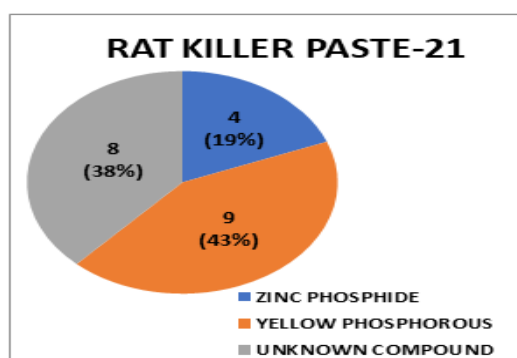


Figure 16

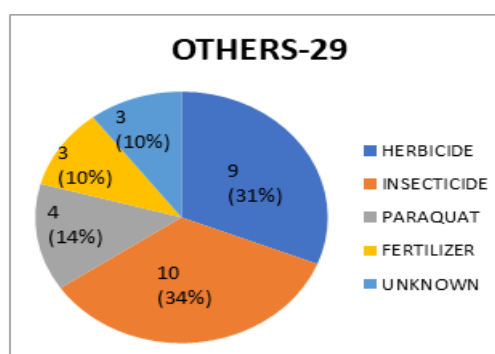


Figure 17

Even though in our study, the common poison intake was ant killer powder, it had zero mortality. Our study shows a high mortality among OPC poisoning similar to the study by M Rajesh Kumar et al¹.

In a study by Kaustav Bhowmick et al⁷, agricultural poisons made up bulk of cases and paraquat had the highest mortality. Similarly in our study, 3 out of 4 patients with paraquat poisoning died.

Based on Duration of Hospital Stay: Among 150 discharges, majority 104(69%) were discharged between 2 to 5 days of admission. Among 23 deaths, majority of deaths-11(48%) occurred within 48 hours of admission.

Table 12: Duration of Hospital Stay

Duration	Discharges	Deaths
<48 HOURS	12(8%)	11(48%)
2-5 DAYS	104(69%)	7(30%)
>5 DAYS	34(23%)	5(22%)
TOTAL	150(100%)	23(100%)

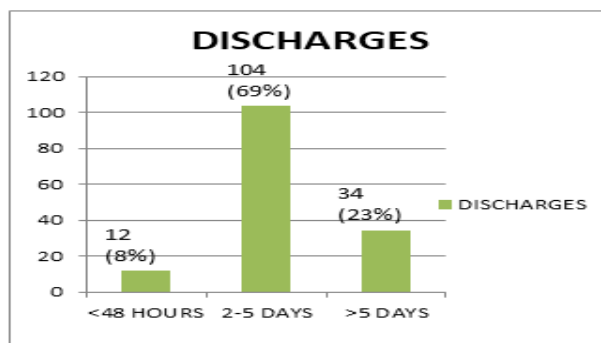


Figure 18

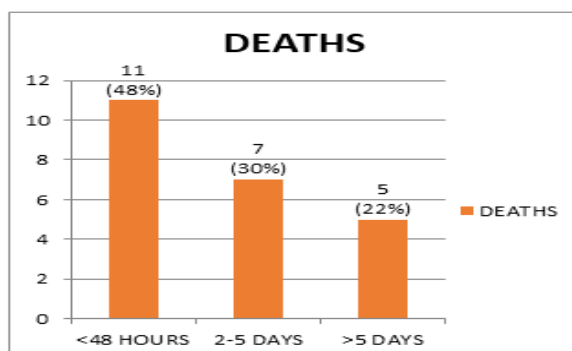


Figure 19

Based on Mortality Rate: Though Ant killer powder is the most common poisoning in our region, it has zero mortality because of its less toxicity in humans. Among 23 deaths, majority of deaths were due to OPC poisoning-12(52%), since it was easily available in our area and the mostly patient presented with early acute respiratory failure which warranted intubation.

Paraquat poisoning had highest mortality rate of 75%, because of its multi-organ involvement and absence of specific antidote. (In our study, the number of patients consumed paraquat were only 4).

Table 13: Number of Deaths and Mortality Rate

Type of Poison	No. of Cases	No. of Deaths	Mortality Rate
OPC	21	12	57%
RAT KILLER PASTE	21	4	19%
PARAQUAT	4	3	75%
RAT KILLER POWDER	5	1	20%
INSECTICIDE	9	1	11%
TABLET OVERDOSE	14	1	7%
PLANT POISONING	20	1	5%

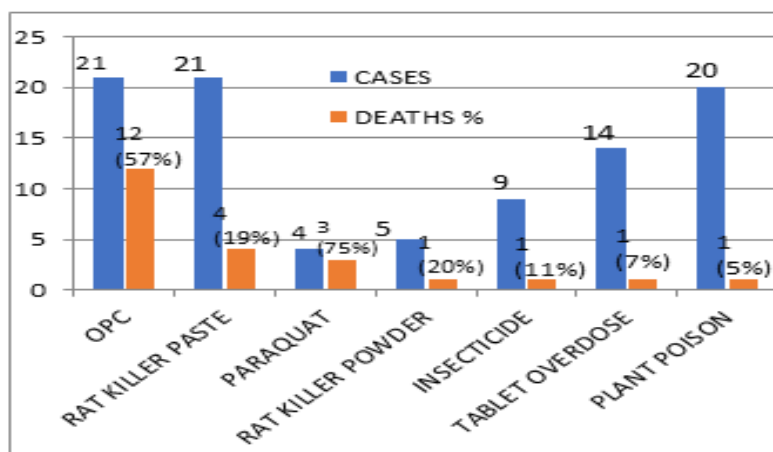


Figure 20: Number of Deaths and Mortality Rate

Discussion

This study was done to know the trend of poisoning in our area with respect to epidemiological factor, types of poison and its outcome.

In our study mainly young adults particularly males from rural agricultural background had consumed different insecticide and pesticide poisons, since our region comes under delta belt where agriculture is the main occupation.

From our study many young patients below 30 years had consumed insecticide poison due to its easy and over the counter availability and due to their impulsive behaviour and high rate of unemployment among them.

Most of the patients who died due to poisoning in our study had presented late to our hospital and most of them had unstable vitals on admission.

So at the community level, the youths has to be educated regarding the harmful effects of various insecticide and employment opportunities has to be created for them by the Government.

The unscrupulous sale of harmful insecticide and pesticide has to be restricted by the government by enacting a law to bring down the mortality rate of such poisonings.

Recently our Government has banned the production and sale of Ratol paste due to its high mortality and common usage among the public.

Based on our study, training programme has to be conducted for the medical officers of the peripheral referral hospitals of our region in initiating an early stomach wash and stabilisation of the vitals of the patients before referring to our tertiary care hospital.

Since in our study, many male patients had consumed poison under the influence of alcohol, Government should initiate a ban on sale and consumption of alcohol in our State to prevent the incidence of poisoning cases.

From the findings in our study, the patients and their relatives should be educated to come early to the hospital instead of delaying by taking native treatment and presenting late to the hospital, since it has a high mortality rate.

Limitations

This study was done for a shorter duration of 3 months period with patients admitted to a single tertiary care referral hospital. To generalize the findings of our study to general population, such type of study should be done for longer period involving large group of people from multicentres.

Conclusion

Young adults(13-30yrs) and males constitute majority of the cases admitted with suicidal poisoning in our study. Most of the males admitted with poisoning had taken it under the influence of alcohol. Insecticide poisons were the most common in our area and among them the highest mortality rate was seen in paraquat and OPC poisoning. Hence young adults should be counselled regarding coping with the stress and how to handle it. In order to reduce the mortality among the poisoning cases, early stomach wash should be initiated and concentration has to be given to stabilise the vitals immediately after admission.

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