

## ANALYSIS OF INCIDENCE PATTERNS OF ACUTE POISONING COMING TO EMERGENCY DEPARTMENT OF A TERTIARY CARE HOSPITAL AND THEIR OUTCOME

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### ABSTRACT

**Objective:-** To determine the incidence pattern and severity and outcome of poisoning cases in emergency department of tertiary care hospital.

**Design:** - prospective observational study.

**Materials and Methods:-** All the poisoning cases due to various ingestible agents who attended Emergency department were evaluated prospectively.

**Results:-** A total of 198 poisoning cases attended emergency department of tertiary care hospital over a study period. In this study the incidence observed was 0.7%. The overall females were 56.6% and males were 43.4%. Most poisoning occurred in the age group 15-25. Organophosphorous was the most common poisoning. Married were 45.5% (n=90) and unmarried cases were 54.5% (n=108) commonly involved in self poisoning. Intentional poisoning comprised 79.8% of all poisonings.

**Conclusion:-** Majority of the intentional poisoning occurred in the female of younger age group and intentional poisoning was found to be most common with the mortality rate 5.6% in the poisoning reported cases. There was a significant population who suffered from the unavailability of ventilator support due to limited resources. It was observed that most of the cases were discharged after getting the primary care in the emergency department of the tertiary care hospital, but those with larger amounts of ingested poison didn't survive even in the first two hours

### INTRODUCTION

Poisoning is a prevailing problem throughout the world [1-9, 24] and its number is increasing day by day. Among the factors responsible for injuries poison is one of the most prevailing cause along with falls, burns, drowning and following on [19, 25]. The most frequent visits to emergency departments are a result of deliberate self poisoning [6, 10-12]. Although the poisoning incidence cannot be measured up to the mark it

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can definitely be concluded that availability and easy access to different chemicals including medicines, pesticides and others greatly influences the poisoning risk [1,2,13].

Seeking the Knowledge of poisoning epidemiology is very essential to both emergency physicians and Public health practitioners [1, 2], but the pattern varies and is not consistent in different regions and over time, sometimes very often [13-16].

Therefore, the regional epidemiological data on poisoning will be very helpful and supportive in future planning and strategies for the appropriate use of the available resources for prevention and management purposes. Various studies on poisoning incorporating single hospital-based, multi-center-based and poison center-based investigations are done on poisoning [1, 5, 6, 17, and 18]

Deliberate poisoning in developed countries is mostly done using medicines, alcohol and household Chemicals and detergents[1, 4, 6], while in developing countries it is associated with the ingestion of agrochemicals, including pesticides due to easy access[13, 17, 21-23]. Suicidal attempts are most common in young adults and one of the most frequent method of suicide is by deliberate self poisoning by using different means. [28][29] [30]

The most common method of suicide and self harming is a result of Self-poisoning. In many under developed countries, the premeditated intake of highly toxic [26] and easily accessible products, especially pesticides, are a leading causes of a high burden of impulsive deaths and disabilities. A potentially large portion of suicidal deaths annually are due to the ingestion of pesticide which poses a major health problem in Asia [20, 27].

Ratio of the deaths due to poisoning, particularly with pesticides is lower in western countries, compared to many Asian countries [31]. The fatality rate from pesticide poisoning in just a single province of china is up to 5.5% [32] In India, deaths from pesticide poisoning are responsible for potentially more than 85% of all deaths due to poisoning [33], In Sri Lanka case fatality rate from pesticides has previously been reported as >10%, with some individual pesticides even exceeding 50% fatality rate, [34] similarly high death rates from pesticides have been reported in Pakistan [35]. So we can conclude from previous literature that it is important to put great emphasis on poison control especially in developing countries in order to improve health care conditions.

This study holds important implications for public health and highlights the high prevalence of accidental household poisoning in the Pakistani population of Asian origin.

The circumstances around an acute poisoning are often obvious and easy to detect, whereas the slow and insidious onset of a chronic poisoning may cause considerable diagnostic difficulties. [36-38]

## **METHOD:**

The study comprises 198 consecutive patients and age more than 11 years. Who were attended in ER department of a tertiary care hospital, they were with acute poisoning. Those who were with snake bite, food poisoning, dog bites and poison occurring from fumes were excluded. Those patients who were admitted to the emergency department were taken for study. Those who meet the criteria were provided with the consent. A pre designed designed questionnaire was used to evaluate the cases.

## **STATISTICAL ANALYSIS:**

Data was analyzed using descriptive analysis on SPSS, and Pearson Chi square, likelihood ratio, correlation and certainty coefficient for the cross tabs tabulation of variables were use to analyze data from SPSS. Mean, mode, Standard deviation were measured those variables, whose frequency is measured. And graphs were reform using MS. Excel.

## **AVAILABILITY OF MEDICATIONS:**

Due to availability of all drugs with or without prescription from a general physician many drugs were reported in the study but organophosphorous being available almost in every house resulted it to be the most commonly drugs used in self harm poisoning alkalis on the second rank to be mostly used for this purpose

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## DATA BASE:

Biomed central, Medline, Cochrane review, Pub Med and Google, Search Engine. The search strategy used the following search terms: SUICIDE or SUICIDAL intention, or SELF-HARM or DELIBERATE SELF-HARM poisoning or self harm Poisoning.

## RESULTS:

The study was conducted on 198 patients with different poisonings. The patients were admitted to the Emergency Department of a tertiary care hospital, Karachi. For diagnosis of poisoning history, intake of poisoning and clinical features like nausea, vomiting, restlessness, excessive thirst, epigastric pain, hypotension, garlic odor in breath and tachypnea were taken into account. All patients who needed intensive care and ventilator support were shifted to the ICU. For each patient, the following characteristics were recorded: age, gender, deliberate or accidental poisoning, economic condition and time in reaching hospital after poisoning and development of respiratory depression and need of intubation, ventilator availability to those with respiratory depression, admission to the ICU and LOS in wards. We also recorded the length of stay in the ICU, mortality rate and the final outcome after being shifted to wards and ICU.

Data showed that 43.4% were males (n=86) and females were 56.6 % (n=112).in which married cases were 45.5% (n=90) and unmarried cases were 54.5 % (n=108).The majority of poison cases were between 11-25 years of age showed in the Figure 1.

Patients who were financially poor were 63.1 % (n=125) who did self-poisoning. A large majority 79.8 % (n=158) case had deliberate intention and 20.2% (n=40) cases were poisoned accidentally Figure 2.

After the exposure to any type poison, the time to reach hospital varies in all subjects. Those who reach the hospital for the primary care in first half hour were 33.8 % (n=67), while others are shown in the Figure 3.

As time was variable in all subjects, different outcomes were observed. Those patients who reached hospital in first two hours were discharged while mostly deaths are observed in the similar time period. This was due to the potency and amount of the poison being consumed. Other results are shown in the Figure 4.

The overall case fatality rate was 5.2% (n =10). The exposure substances identified as most commonly encountered in the emergency department included Organophosphorous with 78.3% (n = 155), the other substances are represented in Figure 5 & chart 1.

The total mortality rate was 3.5% (n = 7); among all the cases male subjects were 5.1% (n = 114) and female 3.2% (n = 72) with exposure to self-poisoning. Those who were admitted to ward were 33.3 % (n=66) and in ICU were 27.3% (n=54) with STD dev 18.144.

## DISCUSSION:

The problem of acute poisoning is increasing day by day and is a major cause of high burden on the hospitals. It's a major cause of frequent visit to the emergency department. [39-41]. Better prevention and management of these patients can be done after determining their incidence and analysis of the patterns and incidence of poisoning.

In the prospective cohort study, our sample consisted the patients who come to emergency of the tertiary care hospital with self poisoning with incidence of 0.7%. Reported incidence of suicidal poisoning has shown in previous study to be higher in females, with female gender dominating up to 67% of self-poisoning cases in rural areas [46], the notion of self-poisoning being more predominant among female population is also evident among other studies [40-45].

The age group (mean=1.36, std. dev= 0.627, n=198) mostly found in this study were mostly in between 11-25 yrs old (n=139, 70.2%), poison cases among 26-40 years were 25.8 % (n=51).

High ratio was observed for attempted suicide (79.8%) while those with accidental were 20.2% (Figure 6). Studies show that attempted suicide cases are more as compared to unintended poisoning [47, 49]. The compounds used for poisoning vary all around but in Pakistan the most commonly used compounds are op and benzodiazepines [48-50]. The patients with organophosphate poisoning were 78.3% in our study, alkalis with 4.5% were on the second highest. 4% took multiple poisoning compounds; the other poisoning agents are mentioned in Figure 8& Chart 1

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An increase in the number of self-poisoning cases may be due to many aspects such as lack of family support system and economic instability. Results of some studies reported that many deaths are due to organophosphate pesticides and occur in the young, economically deprived and teenagers. [54, 63-65]. In recent studies organophosphate poisoning has continued to present as one of the most commonly occurring cause of poisoning in patients admitted to tertiary care settings. For instance studies conducted in Nepal have shown organophosphates to be one of the leading causes of poisoning presenting as the cause in up to 25% of patients admitted in the emergency department of a tertiary care center [67] and up to 38% of autopsied cases of poisoning from the department of forensic medicine and toxicology of a tertiary care center [68]. Pertaining to Pakistan in particular study conducted among patients at National Poisoning Control Center (NPCC) found a staggering 46% of cases of poisoning to be that of organophosphates [69]. In the same institute out of 4,936 reported cases within the time frame of January 2017 to December 2021, 7.1% of the cases had expired whereas 72.6% were discharged with due treatment and 12.8% were given psychiatric or out-patient referrals [70]. It seems that even from recent literature the psychological aspect of poisoning i.e. incidental cases is still possibly an under investigated aspect regarding poisoning cases in the region. Especially while considering the frequency of which victims of poisoning may have to undergo psychiatric referral [70], perhaps emphasizing more on the psychological/mental origin of poisoning would help to incentivize targeted intervention against what could be the root cause of a major portion of cases. Recent study in tertiary care setting have shown 71.66% of study cases of poisoning to be of intentional origin, particularly suicidal motive, with domestic disputes (42.30%) being the main reason for poison consumption [71], organophosphate was yet again found to be the most commonly used chemical. These findings are further supported from other studies, for instance in china a study found that among 859 acute poisoning cases the most prevalent co-morbid was that of depression, and the most common motive for acute poisoning was yet again that of suicide [72], such findings further emphasizes the likely need for psycho-social intervention for optimum

It showed that increasing the delay in reaching hospital has no effect on the mortality. And the number of patients who were shifted to ICU mostly reached in first two hours after ingesting poison.

As many agents have depressing effect on the central nervous system leading to respiratory depression we observed that out of 198 patient 51% (n=101) developed respiratory depression and the remaining 49% (n=97) had no effect of the poison on their respiration. Study show that development of respiratory depression leads to increased LOS [65]. Out of these about 32.3 % needed intubation and ventilation and ventilator was available to 30.8%, whereas ventilator was not available to 11.1 % population. No study is conducted on the need and availability of the ventilators. Remaining 58.1% did not needed ventilators (Figure 6)

Our Results showed that 5.2% deaths occurred. This is in contrasts with data from an Ethiopian study from 2018-2019 which shows a case fatality rate of 1.5% among acute poisoning cases between two hospitals [51], as well as another study from 2021 showing a case fatality rate up to 11.16% [52]. Many patients (93.5%) of patients from a retrospective study in Egypt were discharged after appropriate treatment [66], similar results were observed in our study with 89.9 % ( n=178) of patients discharged from emergency department. Other studies showed that mortality rate is increasing due to poisoning [53-64] Figure 10

## CONCLUSION:

In tertiary care hospitals of Karachi, Pakistan indicate that significant opportunities for reducing mortality exist by better medical management and further restrictions on the most toxic pesticides and agents used for poisoning. This study highlighted the lacunae in the services of tertiary care hospitals and the need to establish a poison information and management center for the better management and prevention of poisoning cases.

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## CHARTS

Poison type	intention		
		deliberate	accidental
Organophosphorous poisoning	Std. Residual	-0.2	0.3
	Count	8	0
Multiple more than two poisons	Std. Residual	0.6	-1.3
	Count	1	0
Methanol and barbiturates	Std. Residual	0.2	-0.4
	Count	6	0
Benzodiazepine	Std. Residual	0.6	-1.1
	Count	2	3
Opiates	Std. Residual	-1	2
	Count	1	0
Barbiturates	Std. Residual	0.2	-0.4
	Count	7	2
Alkali	Std. Residual	0	0.1
	Count	4	1
Alcohol	Std. Residual	0	0
	Count	2	0
Ethanol	Std. Residual	0.3	-0.6
	Count	3	0
Opioids	Std. Residual	0.4	-0.8
	Count	2	1
Opiates and benzodiazepines	Std. Residual	-0.3	0.5

Table 1 Pearson chi square (77.71), df (40), likelihood ratio (49.71)

## FIGURES

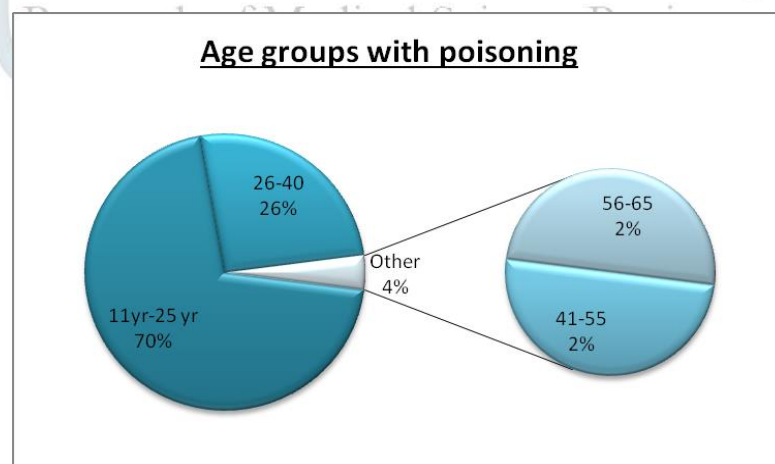


Figure 1



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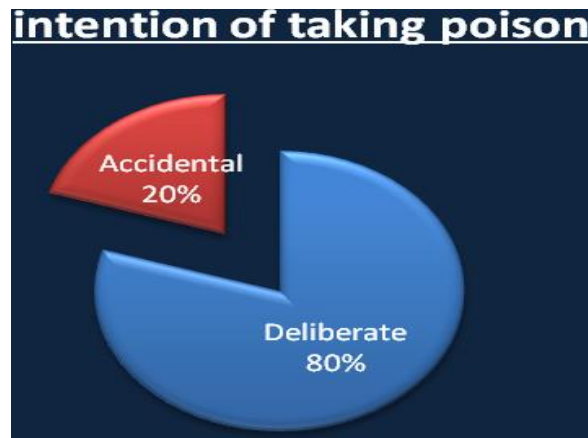


Figure 2

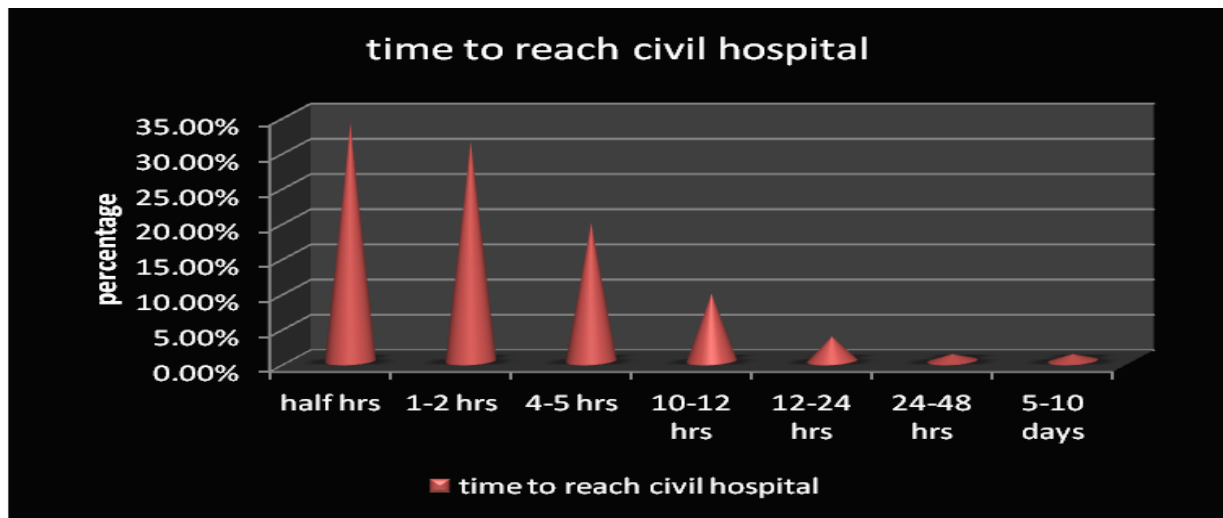


Figure 3

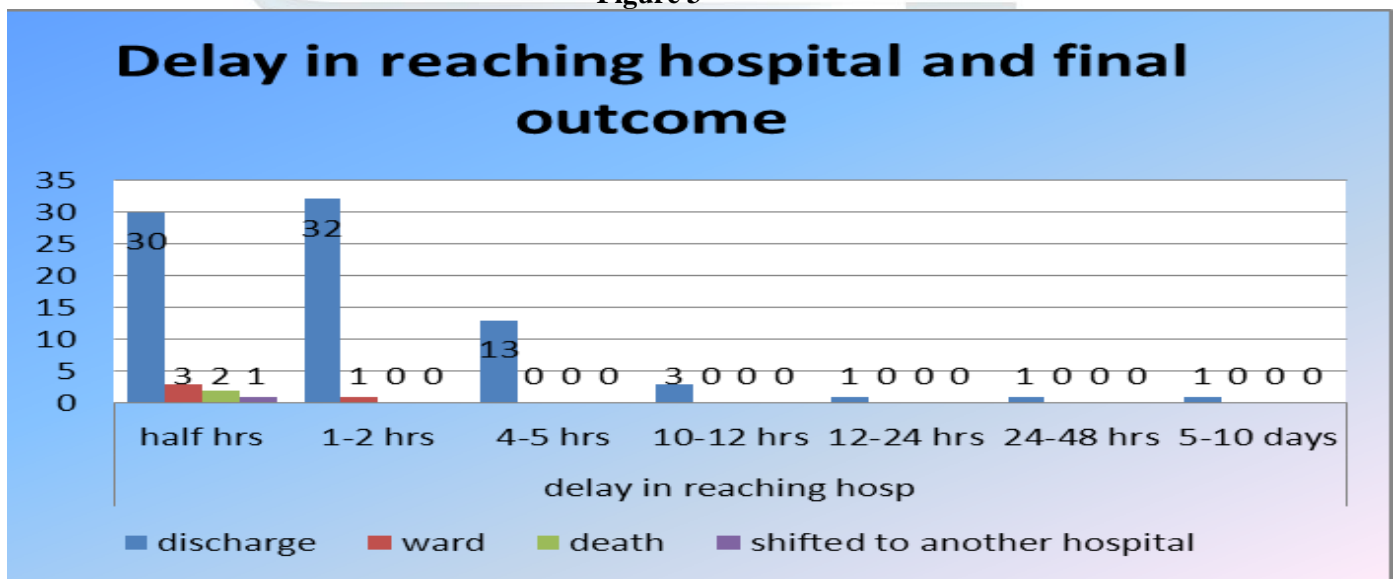


Figure 4

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Figure 5

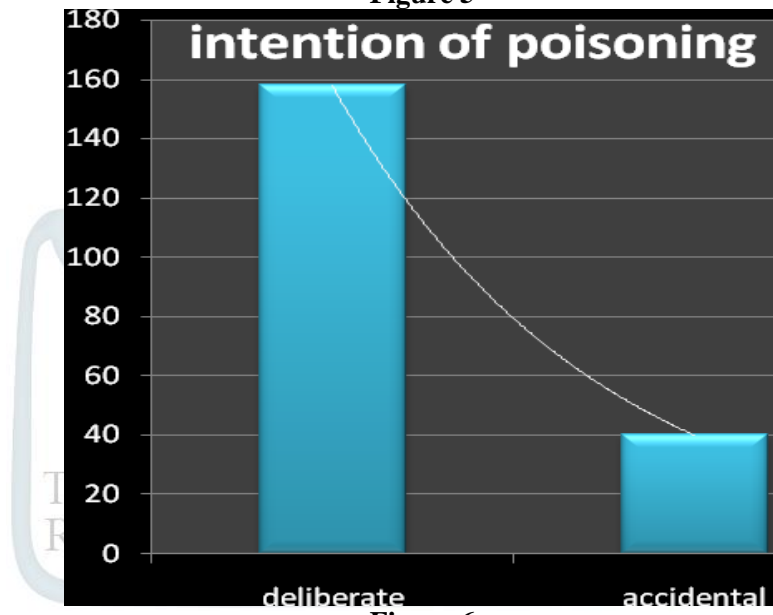


Figure 6

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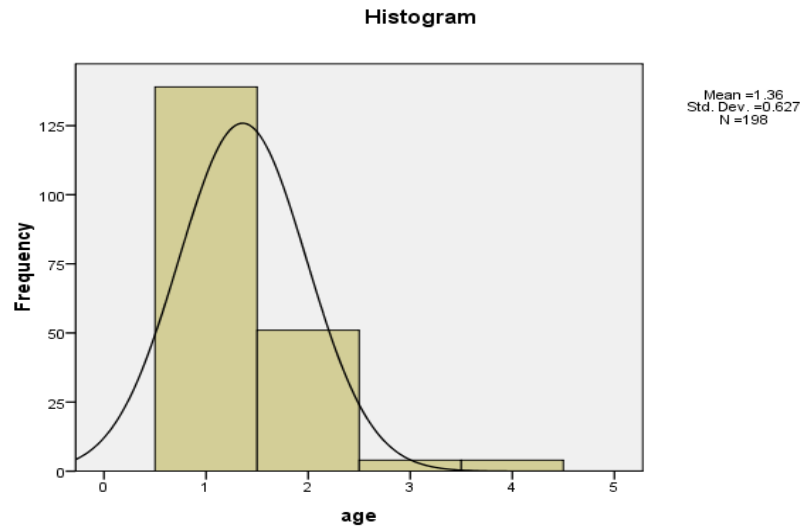


Figure 7

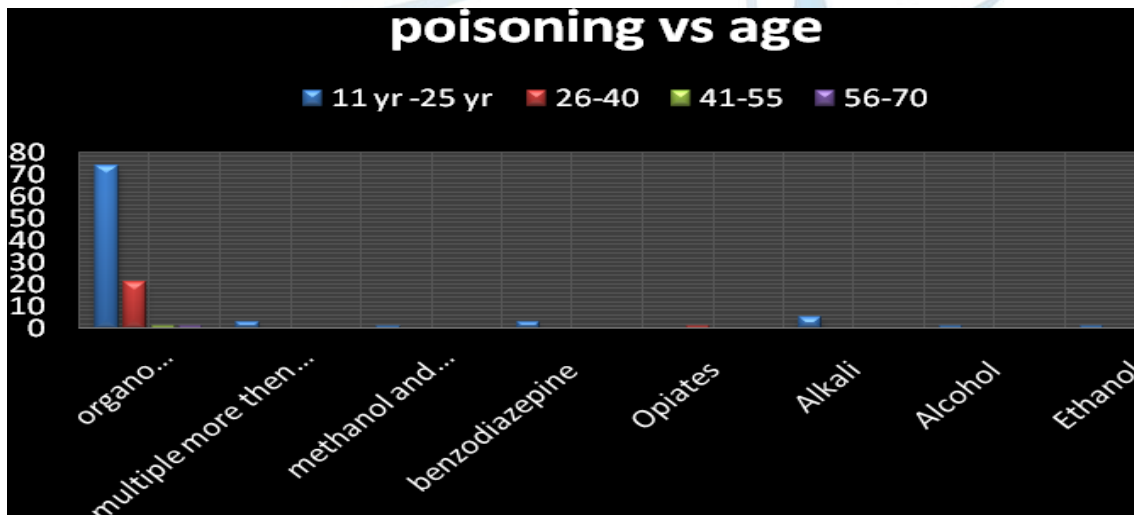


Figure 8 patterns of different poisoning agents. Pearson chi square(72.7), df (30), likelihood ratio (42.86)



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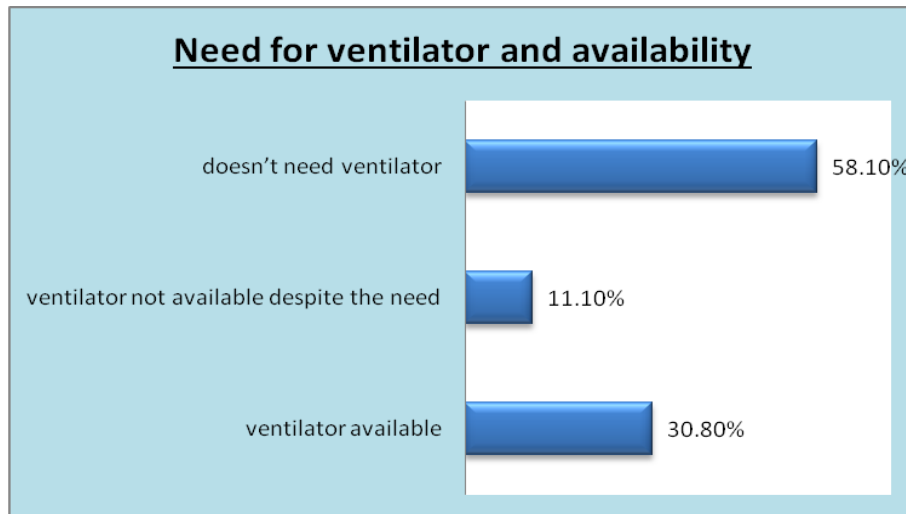


Figure 9

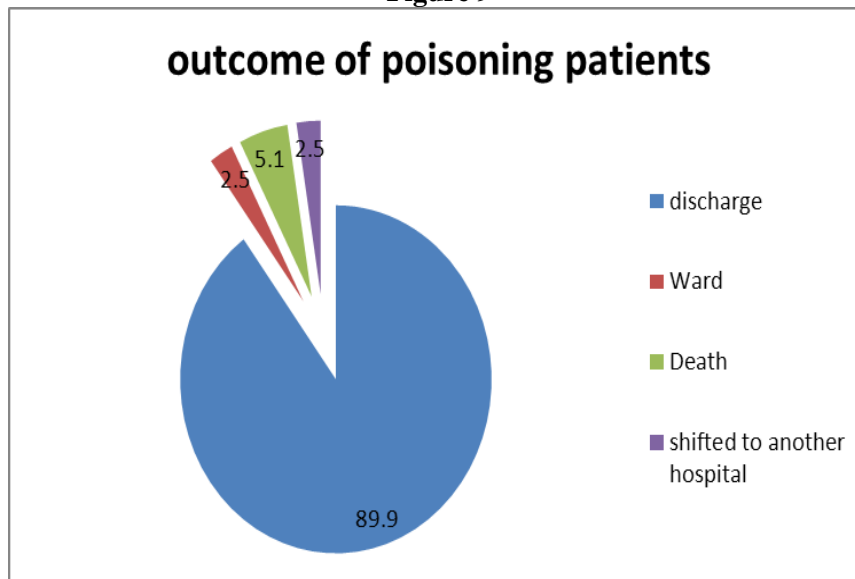


Figure 10

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