

# Analysis of Poisoning Cases at a Tertiary Care Hospital in Bahawalpur

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## ABSTRACT

**Objectives:** The objective was to analyse the poisoning cases coming at A&E Department B.V Hospital Bahawalpur with regard to demographic profile and fatality.

**Study Design:** Cross Sectional Study (Descriptive)

**Setting and Duration of Study:** This study was carried out at A&E Department B.V Hospital Bahawalpur, covering a span of one year. i.e 1<sup>st</sup> January 2017 to 31<sup>st</sup> December 2017.

**Materials and Methods:** A total of 2261 cases were included in this study. After, history was taken, perusal of treatment notes was done, performa was filled and the demographic profile with type of poison was noted.

**Results:** Out of 2261 cases, 1625 (72%) were male and 636 (28%) were females. Most common age group affected was 21-40 years n=1080(48%), while least number of cases noted in above 60 years of age n=95(4%). Maximum number of Black Stone (PPD) n=1093 (48.4%) cases were examined while wheat pills poisoning was recognised as highest toxic agent (45% mortality).

**Conclusion:** In conclusion, our study shows predominant ages were between 21-40 years and males accounted for maximum number of cases. Suicidal intention was commonest manner and PPD was the most frequent one. Wheat pills surfaced as the most lethal poison.

**Keywords:** Poisoning, Paraphenylene Diamine (PPD), Aluminium Phosphide (Wheat pills). Drugs of Addiction

## INTRODUCTION

Mankind knows poisons since ages, causing illness in every living creature on planet Earth.<sup>1</sup> They are not only being used for suicidal and homicidal purposes, but also the frequency of accidental poisoning cannot be overemphasized. According to WHO, about 2 million people are affected by self-intoxication while about 1 million suffer from accidental poisoning.<sup>2</sup> Early poisons were essentially from animal and plant sources. It is believed that many of the famous personalities including Socrates, Alexander the Great and Cleopatra died due to poisoning. Mathieu Joseph B Orfila is regarded as father of modern toxicology, who advocated the importance of chemical analysis for poisoning cases to establish cause of death.<sup>3</sup>

With the advancement in science and technology, newer chemicals are being invented by the scientists raising the count to more than 9 million chemical agents and out of those, only 3000 cause 95% cases of poisoning across the globe.<sup>4</sup> Un-natural deaths caused by poisons ranked 2<sup>nd</sup> to road traffic accidents.<sup>5</sup> A number of factors define the type of poison having fatal outcome, they include demographic profile and availability of poison at a given moment of calendar year.<sup>6</sup> In developed countries, benzodiazepines, ethanol and acetaminophine are the most common causes of poisoning while in the subcontinent where most of the population is employed in agriculture, common causes of poisoning include organophosphates and snake bite.<sup>7,8</sup>

Incidence of deaths related to poisoning is mounting with each passing day, owing to the fact that poisons are cheap, ubiquitously available with high levels of toxicity and mortality. It is also recognised that fatal outcome due to poisoning does not solely depend upon type of poison, other factors such as delayed presentation at the accident and emergency department, inadequate availability of specific medication and improper/undetermined diagnosis contributes to lethality.<sup>9</sup> Most of the treating physicians depends upon the clinical signs and symptoms for the establishment of diagnosis and once they appear, the fatality of the poison ensures. This underscores the vitality of early diagnosis by advanced analytical techniques.<sup>10</sup> The present study was conducted to encompass the severity of the problem by identifying type of poisons, manner of poisoning and different age groups involved in such cases being reported at tertiary care hospital Bahawalpur.

## MATERIAL AND METHODS

A total number of 2261 cases were analysed covering a period of

one year i.e from 1<sup>st</sup> January 2017 to 31<sup>st</sup> December 2017, which were presented with history of poisoning at accident and emergency department B.V Hospital Bahawalpur. Sampling was done by non-probability consecutive sampling for all such cases regardless of their duration of stay at hospital. All those cases that were brought to accident and emergency department after death, were excluded from the study. A performa was prepared and type of poison and manner of poisoning (accidental, suicidal, homicidal) was noted.

Data was analysed on SPSS v 20.0. Frequency and percentage was calculated for gender, type of poison. Effect modifiers like age and gender were controlled through stratification.

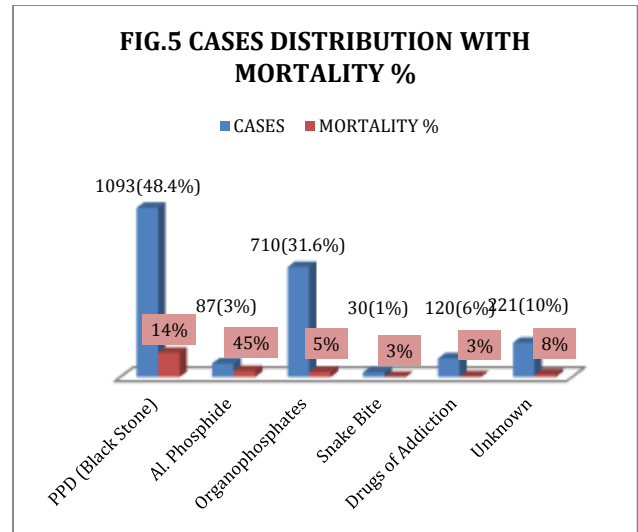
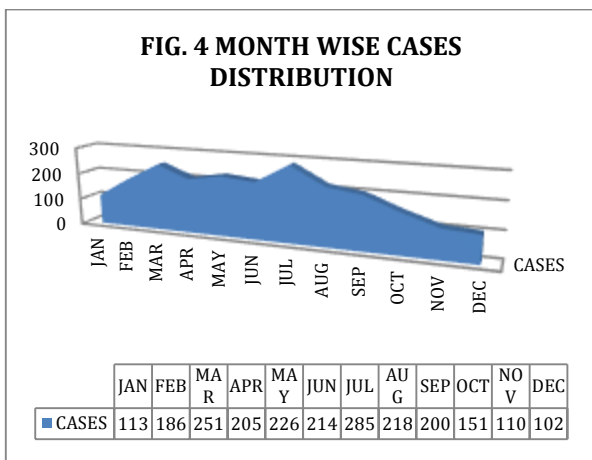
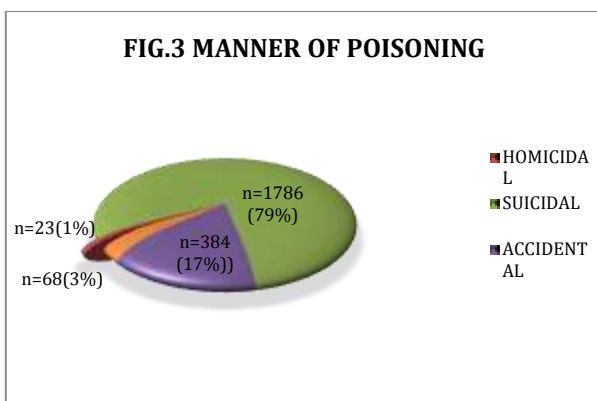
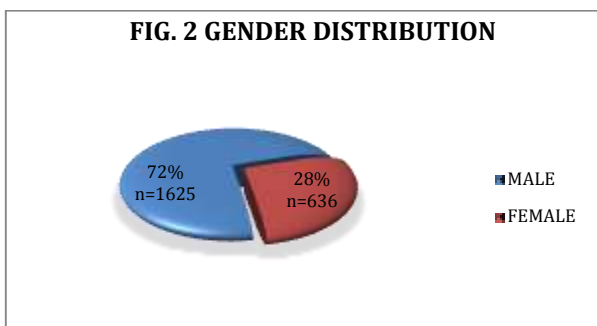
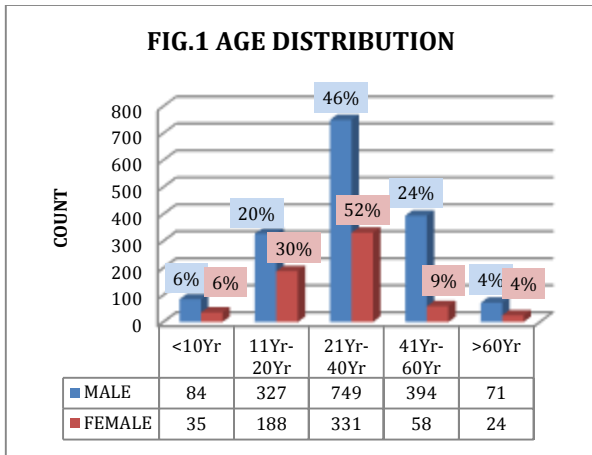
## RESULTS

A total of 2261 cases were analysed during the study period of one year from 01-01-2017 to 31-12-2017.

Table and Fig.1 revealed that most common age group involved was 21-40 years n=1080(48%), while minimum number of cases were reported after 60 years of age n=95(4%). Fig.2 showed that males were predominantly involved with 1625 (72%) cases while female were 636(28%) in number. Most common manner of causation was suicidal 1786(79%), while accidental 386 (17%) ranked 2<sup>nd</sup> (Fig.3). Fig.4 presented that maximum number of cases were reported during month of July n=285. Fig.5 revealed that the commonest poison detected was Paraphenylene Diamine (PPD) also called black stone (Kala Pathar) n=1093(48.4%). Followed by Organophosphates (pesticides) n=710(31.6%), Drugs of addiction n=120(6%), Aluminium Phosphide (Wheat Pills) n=87 (3%), and Snake bites n=30(1%). 221 (10%) cases remained undetermined. Fig.5 also depicted that most fatal poison was Aluminium Phosphide (Wheat Pills), causing death in 45% of cases.

Table 1: Distribution of cases with regard to Age and Gender

Sr.no	Age	Gender		Total (%)
		M	F	
1	<10 Years	84	35	119(5.3%)
2	10-20 Years	301	214	515(22.8%)
3	21-40 Years	674	403	1077(48%)
4	41-60 Years	352	93	445 (19.7%)
5	>60 Years	71	24	95 (4.2%)
	Total	1482 (66%)	769 (34%)	2251 (100%)



**DISCUSSION**

The most common age group affected was between 21-40 years for males (Table & Fig.1). This corresponds to the fact that this age group is the most active group to earn bread and butter for the family, henceforth, has to face the maximum brunt of the society leading to anxiety, depression and a number of other social problems. Secondly, maximum activity means maximum chances of accidental poisoning while on job and in the fields. A number of studies have shown similar results which are consistent with our findings.<sup>2,6-10</sup>

The results indicate that the overwhelming majority of the cases n=1625 (72%) were males (Fig.2). This predominance of males has been attributed to the fact that the males in our country normally are prime income earners who go outside and come across accidents, develop suicidal tendencies and face wrath of society by way of homicidal deaths too. Similar inclination towards male predominance is also noted by Sadia et al<sup>2</sup> (males = 60%) while the findings are comparable with that of Reddy et al<sup>10</sup> where they have noted 46% of cases belong to male gender.

Fig.3 illustrates that most common manner of poisoning noted was suicidal n=1786 which was followed by accidental n=384(17%). These results are consistent with the findings of Gouda et al<sup>8</sup> who found that suicidal poisoning comprised of 78.5% of cases while accidental poisoning turned out to be having 16.5% cases. The results of our study are also comparable with Uzair et al<sup>6</sup> who noted that suicidal deaths accounted for 72% while accidental poisoning stood at 25% of the cases. As Bahawalpur is a cotton growing area, so maximum cases of poisoning happens to be in summer season, owing to the frequent pesticide usage on cotton crop. Our study documented that during the month of July 2017, 285 cases of poisoning were brought to A&E department of B.V Hospital Bahawalpur (Fig.4). These findings are consistent with those gleaned by Mathur et al<sup>9</sup> who claimed that maximum number of poisoning cases were noted during summer season (38.75%).

Fig.5 documents about frequency of type of poisoning cases encountered at tertiary care hospital. The most common poison detected was Paraphenylene Diamine (PPD) also called black stone or Kala Pathar n=1093, this is consistent with the finding of Khan et al<sup>11</sup> who reported 1258 cases of PPD poisoning from January 2016 to April 2017. Organophosphates made a secondary peak at 31.6% of the cases which are comparable with the results of Sadia et al<sup>2</sup> where they noted cases of OGP poisoning at 19%. Drugs of addiction comprised of 10% of the cases, Sadia et al shown that alcohol and benzodiazepine cases reported at 10% collectively. Aluminium phosphide caused poisoning in 3% of the cases which are comparable with 10% cases of Gouda et al.<sup>8</sup>

Snake bites occurred in 1% of the cases in our study, this can be compared with the results of Mathur et al<sup>9</sup> where snake bites caused poisoning in 2.11% of the cases.

Fig.5 provides very important information regarding mortality percentage with respect to type of poisoning. The most lethal poison found was Aluminium Phosphide (wheat pills) causing death in 45% of the cases. This finding is comparable with that by Ghazi et al<sup>11</sup> in which they noted the mortality due to wheat pill poisoning reached upto 70%. Paraphenylene Diamine (PPD) resulted deaths in 14% of the cases. These figures are consistent with the finding of Khan et al<sup>12</sup> who detailed mortality related to PPD as 17.70%, while Tanweer et al<sup>13</sup> calculated mortality due to PPD as 28%. In our study, mortality due to Organophosphates turned out to be 5%, which is consistent with the calculations of Chintale et al<sup>14</sup> (mortality due to OGP 5%), however Shaikh et al<sup>15</sup> found mortality due to OGP at the level of 17.36%. Our study further stated that deaths due to Snake bite and Drugs of addiction were accounted for 3% of the cases per poison. The results of Dandona et al<sup>16</sup> are comparable to our study where they noted deaths due to Snake bite as 7.5%. Gomes et al<sup>11</sup> estimated that since 2010 deaths due to opioid poisoning alone, mortality percentage was 0.6%. A reasonable number of cases were those in which causative poison remained undiagnosed with certainty n=221(10%) causing mortality in 8% of the total cases. This is consistent with the findings of Sadia et al<sup>2</sup> where they observed poisoning due to unknown causes remained at 10%.

## CONCLUSION

In conclusion, our study shows that most common age group was 21-40 years with male predominance. Paraphenylene Diamine found to be the most common causative agent and manner of poisoning due to suicidal intension was noted at the peak. A reasonable number of poisoning cases were due to unknown agent, while Aluminium Phosphide turned out to be the most lethal poison.

**Recommendations:** Proper investigation techniques including GC and HPLC should be provided at all the tertiary care hospitals. Establishment of poisoning control centers, as a separate unit is the need of the day at every teaching hospital. Specialized and skilled staff should be appointed in those centers. Sales of pesticides, wheat pills and PPD should be strictly monitored and a public awareness campaign regarding precautions of their usage should be initiated on media to sensitize the masses at large.

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