

# Trends of poisoning in autopsy subjects in a tertiary care centre of Haryana

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## Abstract

Death due to poisoning is known since ancient time. Death due to poisoning can be either suicidal, homicidal or accidental. Its trend varies in both the genders and in marital status of males and females. Variation is found in different age groups as well. As per the study done in Ahmedabad the suicide rate in India is 10.3. In the last three decades, the suicide rate has increased by 43% but the male female ratio has been stable at 1.4: 1. Majority (71%) of suicide in India are by persons below the age of young years which imposes a huge social, emotional and economic burden. Several studies reveal that suicidal behaviours are much more prevalent than what is officially reported. The present study was undertaken in the department of Forensic Medicine and Toxicology of Pandit Bhagwat Dayal Sharma Postgraduate Institute of Medical Sciences, Rohtak, Haryana to know the trend of poisoning in Haryana state. Total 338 cases of death due to poisoning were selected for this study, which were brought to us for postmortem examination during the span of one year (From Jan 2016 to Dec 2016). Our study revealed that most of the victims of fatal poisoning were married males of age group 21-30 years and belong to rural background.

**Key Words:** Autopsy, Suicide, Homicide, Poisoning.

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## INTRODUCTION

Poison is a substance that being solution in the blood either destroys life or impairs seriously the functions of one or more organs of the body. Poison can be defined as, —A substance (solid, liquid or gas) which if introduced in a living body or brought in contact with any part thereof will produced ill health or death by its constitutional or local effects or both. Due to rapid development in the field of science and technology and vast growth in the industrial and agricultural sector, the poisoning is spreading like a wild fire.<sup>2,3</sup> Poisoning both accidental and intentional is a significant contributor to

mortality and morbidity throughout the world. World Health Organization (WHO) conservatively estimates that about 3 million cases of poisoning occur every year in the world and about 2,20,000 (2.2 Lac) deaths occur due to poisoning. Of these 99% of fatal poisoning occurs in developing countries particularly among agriculture workers<sup>3</sup>. About 50,000 deaths occur every year in India due to poisoning alone. The commonest cause of poisoning in India and other developing countries is pesticides, the reasons being agriculture based economics, poverty unsafe practices, illiteracy, ignorance and lack of protective clothing and easy availability of highly toxic pesticides and among pesticides. Organophosphates form the largest bulk of poisoning in India<sup>1</sup>. Pattern of poisoning in a region depends on variety of factors, such as availability of poisons socioeconomic status of population, religious a cultural influence and availability of poisons. The exact incidence of poisoning in India is uncertain due to lack of data at central level as most cases are not reported, and as mortality data are a poor indicator of incidence of poisoning. It has been estimated that about 5-6 persons per lac of population die due to poisoning every year.<sup>2,3,4,5</sup> Poisoning can be occupational

accidental or intentional exposure. It is a major public health problem in the developing world. Hazardous occupational practices and unsafe storage expose millions of people to toxic effects of pesticides. However, deliberate self-poisoning account for majority of fatal episodes and put tremendous stress. on hospital services, particularly in Asia<sup>6,7</sup>. Many studies have shown that deliberate self-poisoning has a far higher mortality than accidental poisoning.<sup>8,9</sup> The act of self harm has been done to express anger, rebellion or revenge by causing distress to another person in some cultures. Many studies emphasize that not all people who die following acts of self-harm, actually wished to die.<sup>10</sup> The role of intent in an attempted suicide is controversial. Determinants for a fatal event include poison's toxicity, time taken in receiving clinical attention and the efficacy of medical treatment. WHO class I hazardous pesticides are easily available in developing countries and the virtually non-existent medical services in the developing world ensure that the mortality rate for deliberate self-poisoning is at least 20 times higher in these countries.<sup>11</sup>

### MATERIAL AND METHODS

Pandit Bhagwat Dayal Sharma Postgraduate Institute of Medical Sciences, Rohtak is an apex institute of the Haryana state and poisoning cases from all over the Haryana are referred to this institution. The postmortem center at our hospital is under the department of forensic medicine and caters the need of all cases. All the poisoning deaths coming for the postmortem examination to this center are studied. All findings were recorded in specially designed proforma for study. These data was reduced to tables, graphs and subsequently subjected to computer added statistically analysis and conclusions

were drawn. After comparing and discussing with similar type of work carried out by Indian and foreign scholars. Out of total 1483 autopsies, 338 cases of death due to poisoning were selected for the present study, which were referred to us for autopsy examination during the period of one year from January 2017 to December 2016. In all these cases detailed and complete post mortem examination was conducted and information regarding age group, gender, marital status and manner of death were duly recorded. Information from relatives and accompanying police records with autopsy details were used to conclude the manner of poisoning whether suicidal, accidental or homicidal. Finally the details were analyzed and the conclusions were drawn after comparing and discussing with similar type of the work carried out by foreign and Indian authors.

### OBSERVATIONS AND RESULTS

This study was conducted in the Department of Forensic Medicine of Pandit Bhagwat Dayal Sharma Postgraduate Institute of Medical Sciences, Rohtak. Out of total 1483 Post Mortems conducted in the Mortuary of Department of Forensic Medicine in the period of one year i.e. 01-01-2016 to the 31-12-2016 the number of cases of poisoning were 338. Various parameters like age, sex, residence mentioning rural or urban, marital status, occupation, educational status, season of the year, survival time after consumption, mode of poisoning, diurnal variation and history of any chronic illness were noted on a preformed proforma for each case. Every parameter was analyzed separately and results were obtained by using the SPSS 20 software. First of all the gender was noted, describing the number and percentage of males and females from the total number of cases.

**TABLE 1: Gender wise distribution of cases**

Gender	Frequency	Percentage
Male	238	70.4
Female	100	29.6
<b>Total</b>	<b>338</b>	<b>100</b>

It is evident from the above described table and figure that males outnumbered females contributing 70.4% to the total number of cases. Females contributed 29.6% to the total load of cases. The ratio of males to females is 2.38:1. The different age groups were identified and studied and following findings were noted:-

**Table 2: Age wise distribution of cases**

Age (Years)	Male		Female		Total	
	Number	%	Number	%	Number	%
Upto 10	1	0.4%	1	1%	2	0.6
11 – 20	22	9.2%	33	33%	55	16.3
21 – 30	71	29.8%	39	39%	110	32.5
31 – 40	54	22.7%	13	13%	67	19.8
41 – 50	43	18.1%	5	5%	48	14.2
51 – 60	28	11.8%	5	5%	33	9.8

61 – 70	14	5.9%	3	3%	17	5.0
71 – 80	2	1.0%	1	1%	3	0.9
81 – 90	0	0%	0	0%	0	0
91 – 100	3	2.1%	0	0%	3	0.9
Total	238	100%	100	100%	338	100.0

((Chi square- 43.018; p-value: 0.00)

Table 2 and figure 2 depicts that maximum poisoning was seen in young individuals belonging to age group 21 to 30 years i.e. 110 (32.5%) and out of all the cases of this age group males contributed 64.5% and females shared 35.5% of the load. It was followed by age group 31 to 40 years i.e. 68 (19.8%) and males and females shared 80.5% and 19.5% load respectively. It was further followed by age group 11-20 years i.e. 55 (16.3%) in which females shared significant part i.e. 60% and males shared 40% of load. The results are statistically significant. The next parameter studied was manner of poisoning and following results were obtained.

**Table 3: Manner wise distribution of the cases**

Period of the day	Male		Female		Total	
	Number	%	Number	%	Number	%
Suicidal	92	38.7%	36	36%	128	37.9
Accidental	145	60.9%	61	61%	206	60.9
Homicidal	1	0.4%	3	3%	4	1.2
Total	238	100%	100	100%	338	100%

(Chi square- 3.952; p-value: 0.139)

It is evident from the described table 3 and figure 3 that the maximum poisoning occurred accidentally i.e. 60.9% (206 out of 338) while suicidal cases were 37.9% i.e. 128 out of 338. Only 1.2% i.e. 4 out of 338 cases were of homicidal manner. Homicide was more common in females i.e. 75% than males. The results obtained from the study were non significant statistically.

## DISCUSSION

Males outnumbered the females i.e. [238 (70.4%), 100 (29.6%)] respectively which is in consistence with the study done by Unnikrishnan *et al*<sup>12</sup>, Pawaret *al*<sup>13</sup>, Patil *al*<sup>14</sup>, Datiret *al*<sup>5</sup>, Vaidya *et al*<sup>16</sup>, Modi *et al*<sup>17</sup>, Maharani *et al*<sup>18</sup> and Paritekaret *al*<sup>19</sup>. which showed the higher incidence of males. The findings of this study are contrary to the study done by Kristinsson *et al*<sup>20</sup> which showed Male:Female ratio 1:1.23. Study done by Srivastava *et al*<sup>21</sup> showed the higher incidence of poisoning in males (57%) outnumbering females (43%). The poisoning is most common in the age group 21-30 years (32.2%) followed by 31-40 years (20.1%), 11-20 years (16.3%), 41-50 years (14.2%), 51-60 years (9.8%), 61-70 years (5%) and up to 10 years (0.6%) respectively. The number and percentage of poisoning is equal in age groups 71-80 and 91-100 years (0.9%) while no case was noted in age group 81-9- years (0%). The findings are in line with the studies done in past by Pawaret *al*<sup>13</sup>, Patil *al*<sup>14</sup>, Vaidya *et al*<sup>16</sup>, and Maharani *et al*<sup>18</sup> which showed that the incidence is more common in age group 21 to 30 years. Study done by Srivastava *et al*<sup>21</sup> showed the highest incidence of poisoning in the range of 14-40 years. Singh *et al*<sup>22</sup>, Buckley *et al*<sup>23</sup>, Eddleston *et al*<sup>24</sup>, Kiran *et al*<sup>25</sup>, Jesslinet *al*<sup>26</sup>, Memonet *al*<sup>27</sup>, Gupta *et al*<sup>28</sup> observed that there was decreasing trend of poisoning cases after the peak of 21-30 years and it was least in extremes of life. The poisoning is more common in married cases

[248(73.4%)] than unmarried [90(26.6%)] which is in accordance with study done by Prajapati *et al*<sup>29</sup>. Accidental manner of poisoning is the commonest [206(60.9%)] followed by suicidal [128(37.9%)]. Homicidal poisoning cases are least [4(1.2)] which is incongruous with studies done by Pawaret *al*<sup>13</sup>, Datiret *al*<sup>15</sup>, Vaidya *et al*<sup>16</sup>, Kristinsson *et al*<sup>20</sup>, Singh *et al*<sup>22</sup>, Khosyaet *al*<sup>30</sup> and Adinew *et al*<sup>31</sup> which showed suicide being the commonest manner followed by accident. Study done by Sharma *et al*<sup>33</sup> showed that most common manner of poisoning was suicidal (50.89%) followed by accidental (44.57%) and lowest was homicidal (00.33%).

## CONCLUSION

The poisoning is higher in married females (72%) in comparison to married males (63%) and lesser in unmarried females (28%) than unmarried males (37%). In every age group, accident is the commonest manner (average 60.9%), and male is the commonest gender (70.4%). Young age group (21-30 years) is the most affected group (32.2%) followed by age group 31-40 years (20.1%). Accident (60.9%) is the commonest manner of poisoning irrespective of gender, occupation, mode of poisoning, age group, educational status, history of chronic illness and residential status, followed by suicide (37.9%). Homicide (1.2%) is the least common manner but common in females then males.

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