

## Medico-Legal Study of Fatal Poisoning Cases at A Tertiary Care Hospital

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### Abstract

The present study includes all the cases of poisoning or suspected poisoning subjected for autopsy at the Department of Forensic Medicine and Toxicology, Goa Medical College during the period 1<sup>st</sup> March 2020 to 28<sup>th</sup> February 2021 in which it was seen that poisoning accounted for 6.60% of autopsies. 68 cases were brought by SDM. Males and females in the age group 31-40 were commonly affected. Many victims were married males. Students are often victims of fatal poisoning cases. Oral ingestion was the commonest route of exposure. Majority of cases were suicidal and, in many cases, history was given by relatives. No smell for gastric contents was noticed in 51.7% cases.

**Key words:** Poisoning, ingestion; victims;

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### Introduction

Toxicology is a science which deals with the toxicity of substances. The substance inflicting a toxic effect may be a drug, an insecticide, a pesticide or any chemical substance in the environment. In fact every substance is theoretically capable of producing toxicity and every drug is potentially a poison for routine purposes.<sup>1</sup> Poisoning is a common cause of medical emergencies and a threat to public health. It is one of the preferred ways of committing suicide among both males and females in India. It is estimated that more than 50,000 people die every year from toxic exposure in India.<sup>2,3</sup>

### Materials and Methods

Present study includes all the cases of poisoning or suspected poisoning which of Forensic Medicine and Toxicology, Goa

were subjected for autopsy at Department Medical College during the period 1<sup>st</sup> March

2020 to 28<sup>th</sup> February 2021 were considered. Also includes all fatal cases which were admitted at Goa Medical College and Hospital and died later. Information was collected through hospital records, police records, by direct interaction with victim or relatives and finding of autopsy which are presented in tabular forms with respect to various parameters like age, sex, type of poison, mode of poisoning, manner of poisoning, survival period, post mortem findings and chemical analysis results etc.

### Observations and Results

A total of 322 cases of fatal suspected poisoning were subjected to autopsy examination. The incidence of poisoning and various cases of the autopsy is shown in Table1. Out of total of 1288 autopsies, poisoning accounted for 6.60% of cases.

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**Table 1- Showing various types of cases**

Types of cases	N= 1288	%
Natural	272	21.12
Trauma	586	45.5
Hanging	163	12.66
Drowning	182	14.12
Poisoning	85	6.6
	1288	100

Figure No. 1 shows number of hospital deaths and cases brought by police for autopsy. Hospital deaths contributes for 20% of cases of fatal poisoning and majority i.e. 80% were directly brought by the I.O.

Figure no 2 showing sex distribution of cases which reveals that 55 (64.7%) subjects were male and 30 (35.3%) subjects female. Male: female ratio was 1.833.

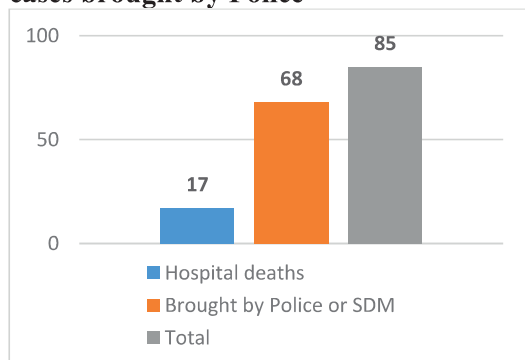
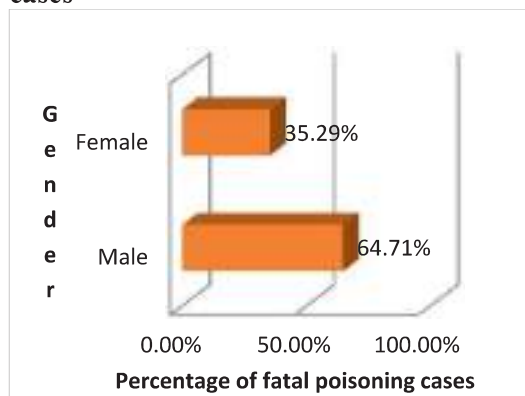
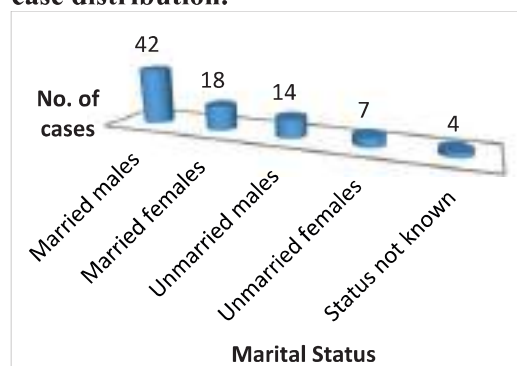
**Figure 1- Showing hospital deaths and cases brought by Police****Figure 2: Showing sex distribution of cases**

Table 2 shows age and sex wise distribution of cases and it was found that

maximum number of subjects were in age group 31 to 40yrs followed by 21 to 30yrs and least common in 0 to 10yrs age group.

Figure no 3 shows case distribution marital status wise in which we see that maximum subjects were married males and married females.

Table No 3 showing occupation wise case distributions in which it is seen that 30.59% of cases were students, 27.06 % were farmer and wage workers and least 2.35 % was seen in retired people.

**Figure 3: Showing marital status wise case distribution.****Table 3: Showing occupation-wise case distributions**

Occupation	No of fatal poisoning cases	%
Student	26	30.59
Businessman	6	7.06
Clerical	12	14.12
Farmers & wage worker	23	27.06
Housewife	4	4.71
Retired	2	2.35
Total	85	100

Table no 4 showing distribution of cases based on route of exposure. It is seen that oral ingestion in 60cases followed by not known in 14 and intravenous in 8 cases.

Table no 5 showing distribution of cases on manner of death which shows 66 cases suicidal, 17 accidental, 0 homicidal and 2 not known.

Figure No 4 showing suspicion wise case distribution in which it is shown that in

maximum number of cases history was given by relatives in 72 cases, 7 cases were suspected by autopsy surgeon and in 02 cases history was given by patient.

Figure No 5 showing smell of stomach contents and mucosa. No smell was seen in 51.77% of cases, sweet and fruity and alcoholic in 16.47% and least common was acridic odour in 1.18% cases.

**Table 2: Showing age and sex distribution of fatal poisoning cases**

Age In Years	Male		Female		Total No. of cases	%
	No. of cases	%	No. of cases	%		
0-10	1	1.18	0	0	1	1.18
11 to 20	4	4.71	8	9.41	12	14.12
21- 30	15	17.65	9	10.59	24	28.24
31- 40	18	21.18	7	8.24	25	29.41
41- 50	11	12.94	5	5.88	16	18.82
51- 60	3	3.53	0	0	3	3.53
Above 60	3	3.53	1	1.18	4	4.71
Total	55	64.71	30	35.29	85	100

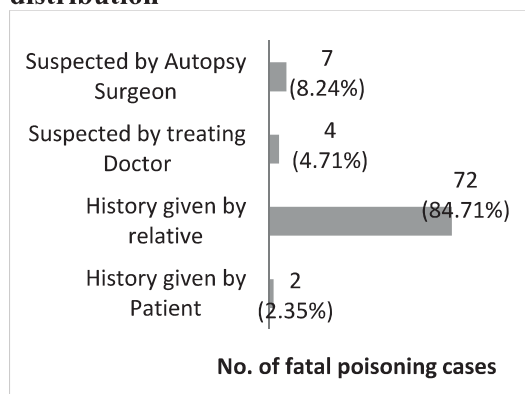
**Table 4: Showing distribution of cases based on route of exposure**

Route of exposure	No. of fatal poisoning cases	%
Ingestion	60	70.59
Intravenous	8	9.41
Intramuscular	3	3.53
Skin contact	0	0
Not known	14	16.47
Total	85	100

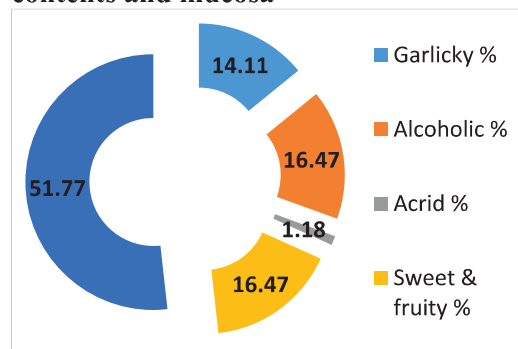
**Table 5: Showing distribution of cases based on manner of death**

Manner	Number of cases
Accidental	17
Suicidal	66
Homicidal	0
Not known	2

**Figure 4: Showing suspicion wise case distribution**



**Figure No 5: Showing smell of stomach contents and mucosa**



### Discussion:

Out of total of 1288 autopsies, poisoning accounted for 6.60% of cases. Garg V and Verma S<sup>4</sup> in their study on trend of poisoning in rural area of South West, Punjab found 12.15 % of total admitted

MLC cases were of poisoning. Findings were similar to those obtained by Naik S B, Alva M, Shetty D<sup>5</sup> in Karnataka. Gupta B D et al<sup>6</sup> in their study on profile of fatal poisoning in and around Jamnagar observed incidence medico legal autopsies in poisoning cases to be 15.98 %.and Gargi J, Tejpal H R et al<sup>7</sup> in their retrospective autopsy study of poisoning cases in Northern region of Punjab observed 11.60 % incidence.

Males to females ratio in present study is (11:6), that is incidence of poisoning was more in males then females. Which is true in case of several studies also.

Job C<sup>8</sup>, Mohanty A C et al<sup>9</sup>, Harish D et al<sup>10</sup>, Behra A et al<sup>11</sup>, Aggarwal N K et al<sup>12</sup> observed higher incidence of poisoning in males then females. This observation may be attributed to a greater number of various responsibilities and stress on the earning member of the family and inability to cope up with them triggers suicides.

Poisoning is not age specific. Poisoning may be seen in a new born child as well as in elderly person. Higher incidence of poisoning was observed in age group of 31 to 40 years in 29.41 % cases followed by 21- 30 years in 28.24 % of fatal poisoning cases in the present study. Similar observations were made by Shetty A K et al<sup>13</sup>, Zariwala R et al<sup>14</sup>, Behra A et al<sup>11</sup>, Job C<sup>8</sup>, Gupta B D et al<sup>6</sup>, Gargi J, Tejpal H R et al<sup>7</sup>, and Dhanya S P et al.<sup>15</sup>

Kohli A & Banerjee KK<sup>16</sup>, from Delhi observed higher incidence of poisoning in the age group 13- 24 years (53.50%) and 25 – 36 years (22.40%). Ramesh K N et al<sup>17</sup> observed that more than 60 % of victims were between the age of 12 and 20 years while 20 to 29 years age group accounted for 30.2% of incidence of poisoning. Sunanda N et al<sup>5</sup> found that highest incidence of poisoning 58 % was seen in the age group 12 to 25 years followed by in 26 to 45 years age group that is 28 %.

The accidental poisoning is common in children. The chemical products most often swallowed by children

are: household cleaners, paraffin and kerosene, cosmetics, medicines, paints and household pesticides. Elderly people tend to poison themselves accidentally. If they cannot see very well, they may pick up the wrong bottle and swallow a household cleaner, for example instead of a drink or a medicine. Old people tend to be forgetful and confused. They may forget to take their medicine or they may take too much and poison themselves because they cannot remember how much to take or when they took the last dose.

Marriage of any person is a new transitory phase in any one's life which adds to responsibilities and psychological pressure on any person. Stressful situations like disharmony existing between family members, dowry, financial problems, depression, and ongoing physical and psychological changes, responsibility of running the family etc these factors trigger suicidal attempt.

As depicted in figure no 5, fatal poisoning cases were more commonly seen among the married males in the present study in 42 cases (49.41%) followed by married females in 18 cases (21.18%). Petrovic B et al<sup>18</sup> in their study on the influence of marital status on epidemiological characteristics of suicides in the South East part of Serbia found married women committing more suicides by poisoning than those who are unmarried. Sunanda N et al<sup>5</sup> found that highest incidence of poisoning that is 66 % was seen in unmarried females followed by married males.

Table no 3 shows occupation wise distribution of cases in which we observed that maximum victims of poisoning were students 30.59 % as they are not able to cope up with the studies, stress, parental stress and competition. Among the student population, 14 cases (16.47%) of fatal poisoning were among undergraduate students, 4 cases (4.71%) were among graduated students and 4 were doing their post-graduation (4.71), two were in higher

secondary (2.35%), one case was in a matric student (1.18%), and 1 (1.18%) was studying in primary school. Fatal poisoning was reported in 27.06 % farmers and wage workers as poisons are easily available, cheap and handy. Lee W J et al<sup>19</sup>, Coye M J<sup>20</sup>, Ivanova I S<sup>21</sup> observed that poisoning is more common among agricultural workers and farmer population. Batra Y K<sup>22</sup>, Atul M<sup>23</sup>, observed that poisoning is more common among school going student population.

Poison may be introduced in the body through different routes, in order of rapidity of action it may be inhalational, injection into the blood vessel, intra muscular, subcutaneous and intra dermal injection, application to a wound or a serous surface, through ingestion, introduction into natural orifices and contact to skin.

Table no<sup>4</sup> shows routes of exposure of poisons and it is seen that the most common route of exposure in 70.59 % in the present study as compared to other routes. Zariwala R et al<sup>14</sup> observed similar findings in their study. As ingestion appears to be more compliant manner as compared to injectables and no pain involved.

In the present study it was observed that as per Police Report suicidal poisoning was reported in 77.65 % fatal poisoning cases followed by accidental in 20 % cases and in 2.35 % cases opinion could not be given, no case of homicidal poisoning was observed in the present study as shown in table no 4. Similar observation were made by Zariwala R et al<sup>14</sup>, observed major chunk were of suicidal cases 62 % cases. Gupta B D et al<sup>6</sup>, Kohli A & Banerjee K K<sup>16</sup>, Murty O P et al<sup>24</sup>, Shetty A K et al<sup>13</sup>, Harish D et al<sup>10</sup> and Haparin J H et al<sup>25</sup> observed that suicide make a major part of the study that is suicidal cases varies from 40 % to 70 % followed by accidental and homicidal cases. Accidental exposure can result from improper use of chemicals at work or play, product mislabeling, label miss reading, mistaken identification of

unlabeled chemicals, uninformed self-medication and dosing error by nurses, parents, pharmacists, physicians and elderly.

Figure No 4 reveals suspicion wise case distribution in which it is shown that in maximum number of cases history was given by relatives in 72 (84.71%) cases, 7 (8.24%) cases were suspected by autopsy surgeon and in 02 (2.35%) cases history was given by patient. Only 4 cases (4.71%) were suspected by treating doctor.

Figure No 5 showing smell of stomach contents and mucosa. In the present study no characteristic smell was observed from stomach contents and mucosa at autopsy in 44 cases (51.77%).

Mohanty et al<sup>26</sup> has reported that out of 144 cases characteristic smell was absent in 53.43% cases. Likewise Zariwala R et al<sup>14</sup> observed that in 36.2% cases no smell was noted. Dhatarwal S K<sup>27</sup> observed that there was sweet and fruity smell to stomach contents and mucosa in most of the insecticidal poisoning cases.

Garlicky odour was observed in 64.71 % cases. Garlicky odour was more common in cases with alleged history of ratol paste consumption. Alcohol odour was more in cases with alleged history of insecticidal poisoning. Acrid odour was seen in single dettol poisoning case. Sweet and fruity odour was noted in total of 13 cases (15.29%)

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