

## Original Article

# Death due to Poisoning - a Medicolegal Study at Dhaka Medical College, Dhaka

M Ahmad<sup>1</sup>, FN Rahman<sup>2</sup>, MM Islam<sup>3</sup>, MRU Majumder<sup>4</sup>

### Abstract:

Self destruction or suicide by pesticide poisoning is a burning problem of Bangladesh. Rapid development in science and rapid growth in agricultural activities has led to the increase in the incidences of poisoning. The objective of this study was to find out the incidences and pattern of poisoning in an urban area, different aspects of poisoning along with demographic pattern, social factors related and other related perimeter, and modality to prevent loss of precious life due to poisoning. This retrospective cross sectional study was conducted among victims of poisoning at Dhaka Medical College, Dhaka Morgue during the period of January 2008-December 2009. Specific identification of poisons was made from Chemical Examiner's report. All the data were later on analyzed. A total of 5114 medico legal post mortems were performed during this study period. Among these 300 (5.87%) cases were suspected poisoning. Out of these cases specific poisons were identified in 131 (43.66%) cases. Among the detected poisoning cases OPC was the commonest agent 103 (78.63%) followed by alcohol/rectified spirit 12 (9.16%) and barbiturate 7 (5.34%). No poison was detected (Negative results) in 116 (38.66%) cases and no reports from chemical examiner were received in 53 (17.66%) cases during the study period. Out of 300 victims 174 (58%) were male and 126 (42%) were female. Highest incidence of poisoning was observed in 21-30 years age group 117 (39%) followed by age group of 31-40 years 84 (28%). Most of the victims were agricultural workers/ farmers 108 (36%) followed by housewives 51 (17%). Among the study subjects 178 (59.33%) were illiterate and 198 (66%) were married. Considering manner of death 274 (91.33%) victims committed suicide by poisoning and rests 26 (8.67%) were due to accidental poisoning. To reduce poisoning cases proper emphasis should be given for safe use of pesticides and consciousness should be created among the population about poisonous compounds. Detail study regarding death due to poisoning is required to be carried out in this country.

**Key words:** Death, Poisoning, Autopsy.

### Introduction:

Every unnatural death whether suicidal, accidental or homicidal, represents a tragic waste of precious human life and resources<sup>1</sup>. Death due to poisoning is no exception. Bangladesh is a developing country where rural population is mostly dependant on agriculture. Pesticides act as a common agent for suicidal purpose after trivial family problems and in developing countries kill around 3,00,000 people each year<sup>2-4</sup>. Suicidal death in industrialized countries are also caused by pesticide ingestion<sup>5,6</sup>. Poisoning cases can also occur accidentally and rarely as homicidal purpose. Accidental poisoning occurs in manufacturers,

users, children of users, packers, sprayers and due to contamination of food grains mixed with insecticides preserved for seedling purposes. Poisoning also occurs from fruits and vegetables<sup>7</sup>. Homicidal poisoning by insecticides is usually rare, because of the smell of aromax used as diluents in the poison and also due to alarming signs and symptoms which appear rather early. Unfortunately death by poisoning is seldom included as a priority for health research in our country.

### Objective:

The objective of this study was to find out the incidences and pattern of poisoning in an urban area, different aspects of poisoning along with demographic pattern, social factors related and other related perimeter, and modality to prevent loss of precious life due to poisoning.

### Materials and Methods:

This retrospective cross sectional study was conducted among victims of poisoning at the Dhaka Medical College, Dhaka Morgue during the period of January 2008-December 2009. Various identification data of the study subjects were noted from the inquest report accompanying the dead bodies, information from

1. Lt Col (Dr.) Mushtaq Ahmad, DFM, MCPS, Associate Professor & Head, Dept of Forensic Medicine & Toxicology, Armed Forces Medical College, Dhaka.

2. Dr. Fariyal Naima Rahman, DMU, Lecturer, Dept of Forensic Medicine & Toxicology, Armed Forces Medical College, Dhaka.

3. Dr. Md. Mozaharul Islam, DFM, MCPS, Lecturer, Forensic Medicine, Faridpur Medical College, Faridpur.

4. Capt (Dr) Md Rakib Uddin Majumder, DFM, MCPS, Lecturer, Dept of Forensic Medicine & Toxicology, Armed Forces Medical College, Dhaka.

### Address of correspondence :

Lt Col (Dr.) Mushtaq Ahmad, DFM, MCPS, Associate Professor & Head, Dept of Forensic Medicine & Toxicology, Armed Forces Medical College, Dhaka. Mobile: +88-01711140546  
Email: mushtaq863@yahoo.com.

the victim's attendants and 3rd copy of post mortem reports preserved in the Forensic Medicine Department of DMC. Specific identification of poisons was made from Chemical Examiner's report. From ethical points of view necessary consent of doctors who performed the autopsies and relatives of victims have been taken. All the data were later on analyzed.

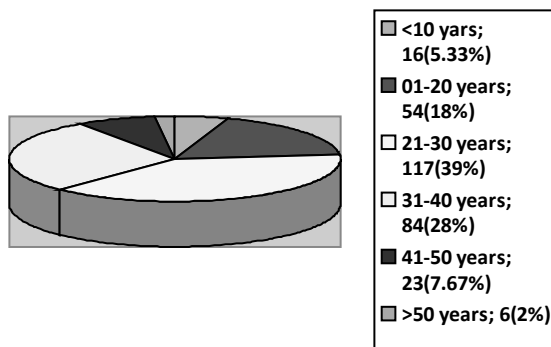
**Results:**

A total of 5114 medico legal post mortems were performed during this study period. Among these 300 cases (5.87%) were due to poisoning. Out of these cases specific poisons were identified in 131 (43.66%) cases. Among the detected poisoning cases OPC was the commonest agent 103 (78.63%) followed by alcohol/rectified spirit 12 (9.16%) and barbiturate 7 (5.34%). No poison was detected (Negative results) in 116 (38.66%) cases and no reports from chemical examiner were received in 53 (17.66%) cases during the study period. Out of 300 victims 174 (58%) were male and 126 (42%) were female. Highest incidence of poisoning was observed in 21-30 years age group 117 (39%) followed by age group of 31-40 years 84 (28%). Most of the victims were agricultural workers/farmers 108 (36%) followed by housewives 51 (17%). Among the study subjects 178 (59.33%) were illiterate and 198 (66%) were married. Considering manner of death 274 (91.33%) victims committed suicide by poisoning and rests 26 (8.67%) were due to accidental poisoning.

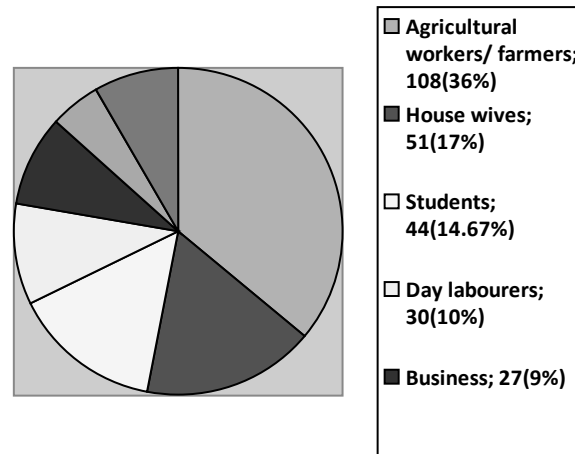
**Table I:** Types of detected poisonous compounds (n=113)

Name of poisonous compounds	Number of victims	Percentage
Organo Phosphorus Compounds-OPC	103	78.63
Methyl Alcohol (Spirit)	12	9.16
Diazepam	7	5.34
Zinc Phosphide ( Rat killer)	3	2.29
Others: Savlon , Harpic, Nicotine, Permethrine (Mosquito coil), Organo carbamate.	6	4.58

**Fig-1:** Age distribution of poisoning victims (n=300)



**Fig-2:** Distribution of poisoning victims by profession (n=300)



**Discussion:**

Death by poisoning is commonly suicidal or accidental in nature. Among chemicals organo-phosphorus compounds are the commonest one used for suicidal purpose. In South-East Asia, chemicals such as paraquat, parathion, acetic acid used for rubber preparation and Opium, diazepam, barbiturate are also used for self destruction. A study in India has shown that dichlorvos (76% EC) is also used as injectable suicidal agent<sup>8-10</sup>.

During post mortem examination of poisoning cases some typical points were noted like cyanosis in lip, finger, nose of the study subjects, blood stained froth in mouth and nostrils, the peculiar smell of OPC in stomach contents. All the internal organs were congested. Sub mucosal petechial haemorrhage was found in stomach. Excessive oedema and subpleural petechial haemorrhage were also present<sup>11</sup>.

Out of 5114 autopsies performed during this study period of January 2008- December 2009, 300 (10.33%) were cases of poisoning. Among these, specific poisons were identified in 131 (43.66%) cases. OPC was the commonest agent 103 (78.63%) followed by alcohol/rectified spirit 12 (9.16%) and barbiturate 7 (5.34%). People of nearby densely populated area live on agricultural cultivations, hence OPC poisoning are common. Illiterate people of slums in and around Dhaka city also take country made cheap alcohol (spirit, methyl alcohol) for leisure and addiction which is responsible for poisoning. Overdoses of spirit/ methyl alcohol causes accidental death of these people. In urban area sedative like diazepam is the choice of drugs for suicide. House holds easily available poisons like Savlon, harpic, rat killer, mosquito coil are also responsible for poisoning.

A study performed in Bangladesh from January 1991 to December 1994 showed that among 405 cases of poisoning, OPC poisoning was the commonest one (38.8%), followed by poisoning with sedative (29.1%). Out of those 405 cases; 310 were suicidal (76.54%) and 95 were homicidal (23.45%)<sup>12</sup>. In our study poisoning by OPC was also the commonest one 103 (80.53%), which coincides with findings of this study. Considering manner of death we found 274 (90.47%) victims committed suicide by poisoning and 26 (9.53%) were accidental poisoning cases. We did not find any homicidal cases which differ from previous study performed almost two decades ago. May be it is because now a days people become more oriented to insecticides and applying OPC to other people for homicide is difficult for its peculiar kerosene like smell.

Farmers of our country use pesticides without knowing their harmful side effects. Organo phosphate, organo carbamate and synthetic pyrethroid are used as most popular pesticides in Bangladesh<sup>13</sup>. Epidemiological work from Spain supports link between chronic OPC exposure and increased suicidal rate<sup>14</sup>. Chronic exposure to OPC also gives rise to a condition called COPIND-Chronic Organo Phosphate induced neuro-psychiatric disorder<sup>15-17</sup>. Genetic differences also play important role in Chronic OPC poisoning cases<sup>18</sup>.

A study from India (1970-1979) showed that out of 312 cases of poisoning 30.12% were barbiturate, 19.23% organo chemicals and 17.95% metallic irritants and corrosive<sup>19</sup>. During 1980-1989, another 555 cases of poisoning were reported from the same region and 31.35% fatalities were attributed to aluminium-phosphide, 27.03% to organophosphates and carbamates, 8.83% to barbiturates and 9.36% to metallic irritants and corrosives<sup>20</sup>. A total of 1035 cases of acute poisoning were studied during 1983 to 1996 at New Delhi and the trends showed increasing use of agrochemicals<sup>21</sup>. In our study we did not find barbiturate as commonest agent for poisoning because these drugs are not available as over the counter drugs in our country.

Another study from Rohtak, India in 1993-1994 analyzed 559 cases of poisoning<sup>22-23</sup> and Aluminium Phosphide was found to be the most common poison. According to National Crime Records Bureau India, every 5 minutes a person commits suicide and 7 attempts to kill themselves, forming about 1,00,000 death per year<sup>24</sup>. Suicide rate is highest in the state of Kerala<sup>25</sup>. Majority of the victims belong to the group 14- 34 years<sup>26</sup> and OPC was the most common agent used for suicide purpose<sup>27</sup>. In Sri Lanka, many thousands of hospitals admissions each year are for agrochemical poisoning, (16,649 in 1983) with over a

thousand death annually (1521 in 1983). Of these, about three quarter are self administered, the remainder being occupational and accidental<sup>28,29</sup>. In Sri Lanka, another study showed, incidence of suicide due to poisoning was more than 80 %, followed by hanging, which constituted 10.7 %<sup>30</sup>.

In our study no poison was detected (negative results) in 116 (38.66%) cases and no reports from chemical examiners were received in 53 (16.66%) cases. Faulty or negative results can be found when poison (irritant poisons) is eliminated by vomiting or diarrhoea; excreted by lungs through evaporation or oxidation; detoxified, eliminated or conjugated in alimentary system; rapidly metabolize drugs; vegetable alkaloids and also due to faulty technique of preservation, long time preservation; sample from decomposed body and even faults at the chemical examiners laboratory<sup>11</sup>. The only chemical examiner's laboratory of our country is already over burdened with toxicological samples from all around the country and sometimes cannot send the results in due time which explains the non availability of some reports during study period.

In our study out of 300 victims 174 (58%) were male and 126 (42%) were female. Among them 198 (66%) were married. Highest incidence of poisoning was observed in 21-30 years age group (39%) followed by age group of 31-40 years (28%). Males being predominantly the earning member of the family have more access to poisonous materials than females. Another study in Bangladesh performed from January 1993 to December 1997 showed that males (61.30%) were predominant than females (38.70%) in poisoning cases. The report coincides with our study. Acute poisoning was observed more in married group (68.64%) than unmarried group (31.36%). Male female ratio was 6:1. Commonest poisoning agent was insecticides OPC<sup>31</sup>. Yet another study performed from October 2010-March 2011 also showed that majority of poisoning victims (43%) were below 25 years of age and 83% were male victims<sup>32</sup>. Faiz and Hasan (1998) also showed male female ratio as 2.21:1 in another study<sup>33</sup>.

A recent study in Bangladesh performed during January -December 2009 in our same study institute showed that among all suicidal deaths 59% was due to hanging, followed by 31% poisoning and 10% due to other causes like burn, fall from height, gun shot injury etc<sup>34</sup>. Among the poisoning victims 162 (54%) were male and 138 (46%) were female. It also coincides with our study in which male are also predominant (58%).

### Conclusion:

Poisoning by agrochemical compounds is an important problem in this country. Proper emphasis should be given for safe use of pesticides. Consciousness should be created among the population about poisonous

compounds. Community education in rural area should be practiced. Decrease literacy rate is a common problem which can be overcome in due time with proper efforts. Detail study regarding death due to organo-phosphorus compounds poisoning is required to be carried out in this country. The existing law in relation to pesticide should be incorporated to erase the loopholes for their production, distribution, sale, storage and application. Public awareness about seriousness of poisonings expected to reduce the incidences.

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